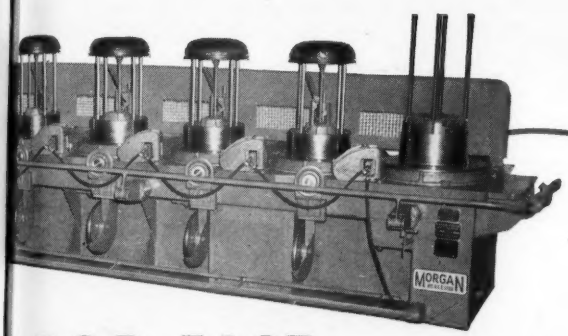
WIRE AND WIRE PRODUCTS

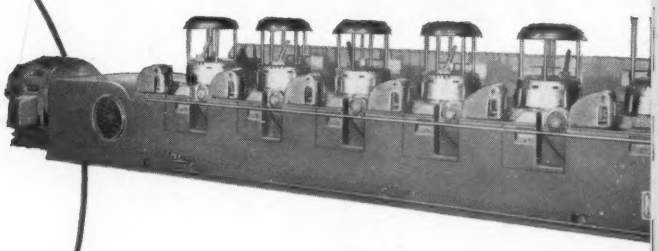
AUGUST 1955

WM-95

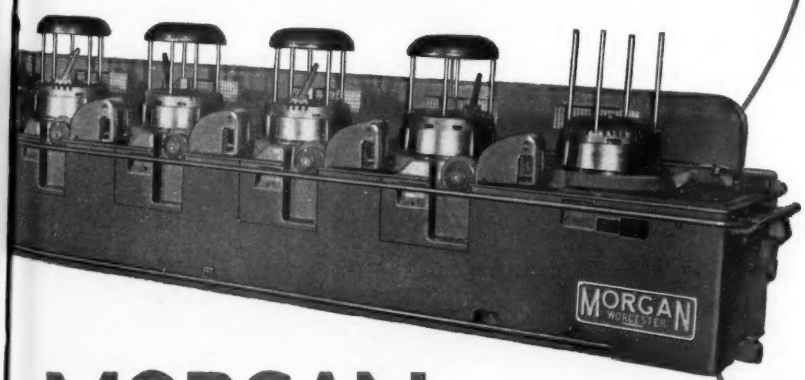
Use
MORGAN
Equipment



FOR FAST
EFFICIENT
WIRE DRAWING



TO LOWER
COSTS AND
INCREASE
PRODUCTION



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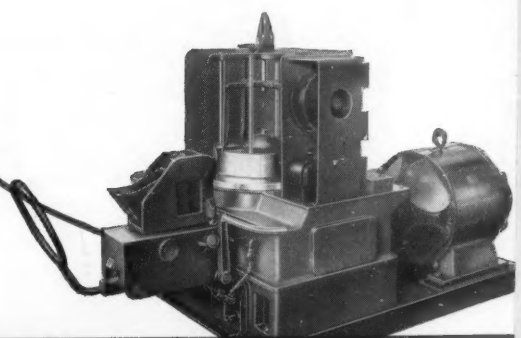

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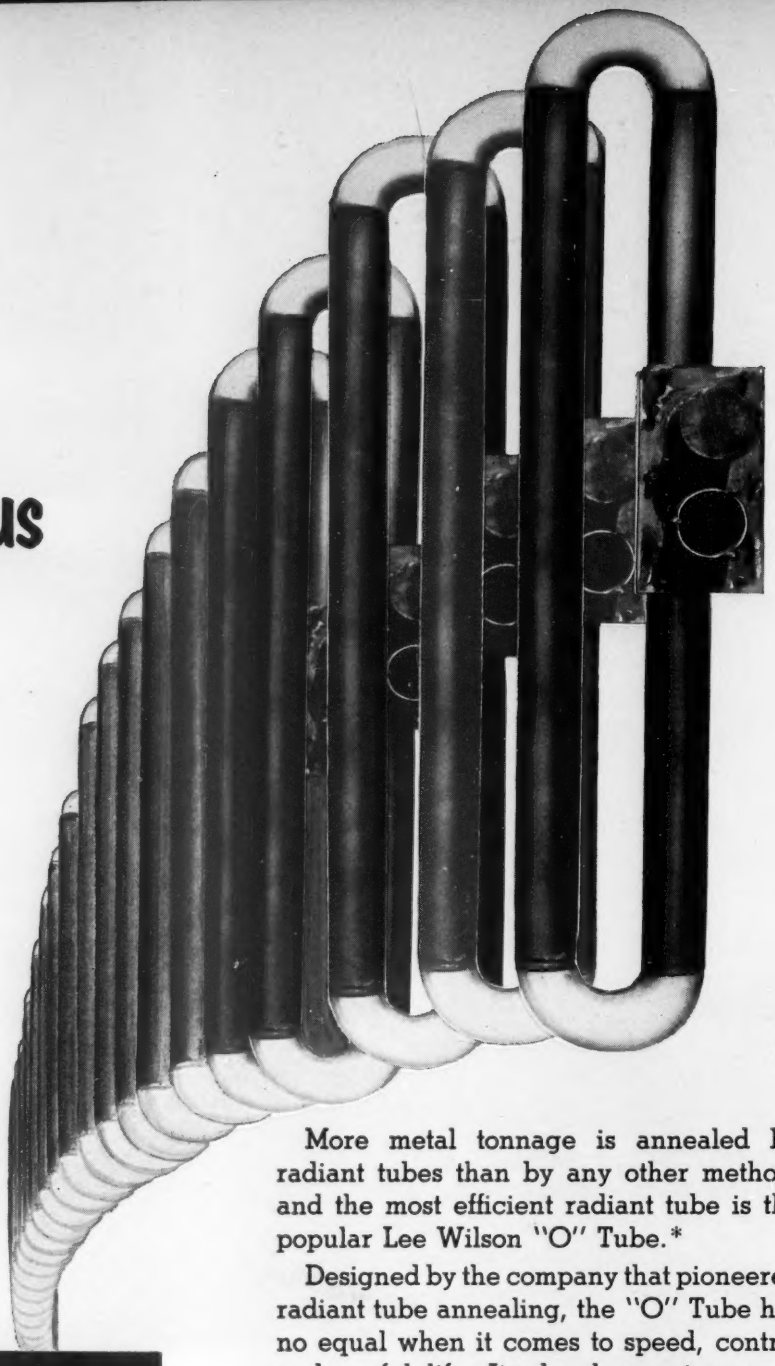
WORCESTER, MASSACHUSETTS

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

Here's the Most Famous Industrial Heating Element Marketed Today . . .



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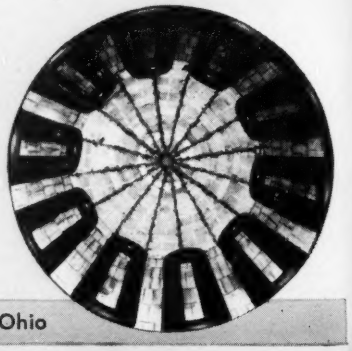
More metal tonnage is annealed by radiant tubes than by any other method, and the most efficient radiant tube is the popular Lee Wilson "O" Tube.*

Designed by the company that pioneered radiant tube annealing, the "O" Tube has no equal when it comes to speed, control and useful life. Its development was responsible to a great degree for making the Lee Wilson Single-Stack the fastest selling wire and rod annealing furnace on the market today.

*Now standard equipment on all Wilson wire annealing furnaces.



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"America's Finest Wire Drawing Lubricants"

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EXCELLENT LUBRICANT FOR DRAWING MECHANICALLY DESCALED RODS & WIRE

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CHICAGO 44, ILLINOIS
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Sizzling steak on a steel wire grill

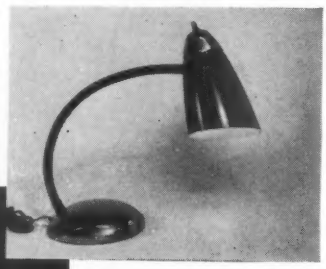
In making their line of braziers, small tables, lamps and other specialties, Keystone Lamp Manufacturing Corp. is using various types of Bethlehem wire, including bethanized wire, electrolytically coated with pure zinc by our unique process, low-carbon bright wire, high-carbon spring wire, and other grades.

Keystone is making braziers by the thousands at its Slatington, Pa., plant, trying to keep up with the growing demand. These portable grills have a 16-in. steel bowl which is removable for table-top use. Its slow, even heat is ideal for charcoaling a juicy steak to sizzling perfection. And the solid bottom keeps ashes from dropping out.

Whatever you need in steel wire, you can be pretty sure that Bethlehem makes it. In addition to the standard grades we specialize in producing single-purpose types, each tailormade for a given application.

Our metallurgists and salesmen will work with you all the way, both in selecting suitable grades of steel wire and in helping you to get the most out of them. Often we're able to come up with a suggestion that turns a problem into a profit for our customers. Just write to us at Bethlehem, Pa., or at our nearest sales office.

This popular model of "Bar-B-Bowl" has hinged legs for easy folding, a removable bowl and adjustable wire grill. Its slow, even heat charcoals a steak to perfection.



This attractive goose-neck desk light is one of many styles of lamps made by Keystone. Bethlehem wire of triangular section is used in making the goose neck.

The sturdy grill, welded from Bethlehem wire and nickel-plated, rests on wire legs and can be reversed for faster broiling. The bowl, legs, and other parts of the brazier are formed from Bethlehem cold-rolled strip.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
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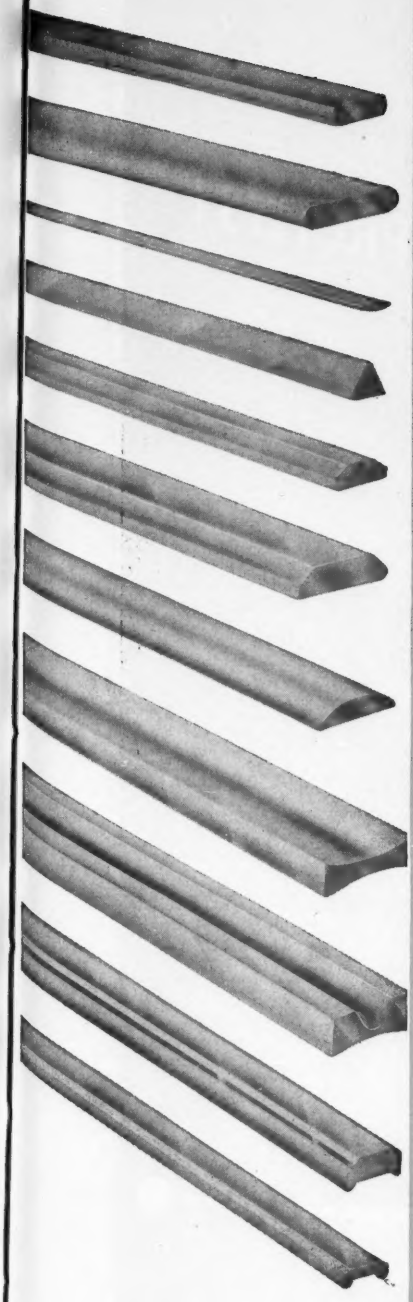
BETHLEHEM STEEL

BETHLEHEM STEEL



NATIONAL

WIRE

(COLD ROLLED)

in Coils or Straight Lengths

COMPLETE METALLURGICAL SERVICE

NLW

Manufacturers of

SPRING WASHERS	RETAINING RINGS
ROUND EDGE FLAT WIRE	KEYSTONE SHAPED WIRE
SQUARE EDGE FLAT WIRE	SPECIAL SHAPED WIRE

Shaped Wire in Coils or Straight Lengths, Ferrous or Non-Ferrous.

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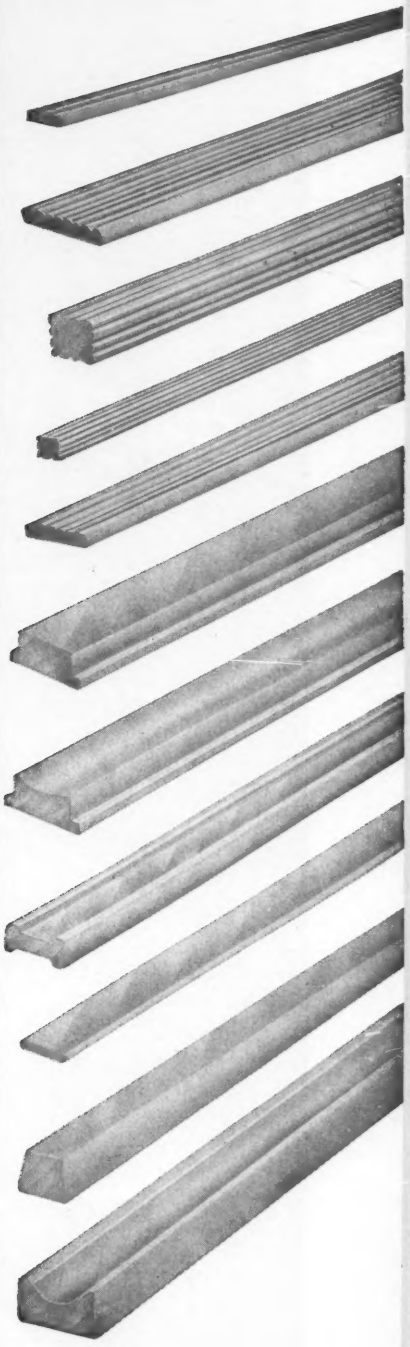

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THE NATIONAL LOCK WASHER COMPANY

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Full details upon request.

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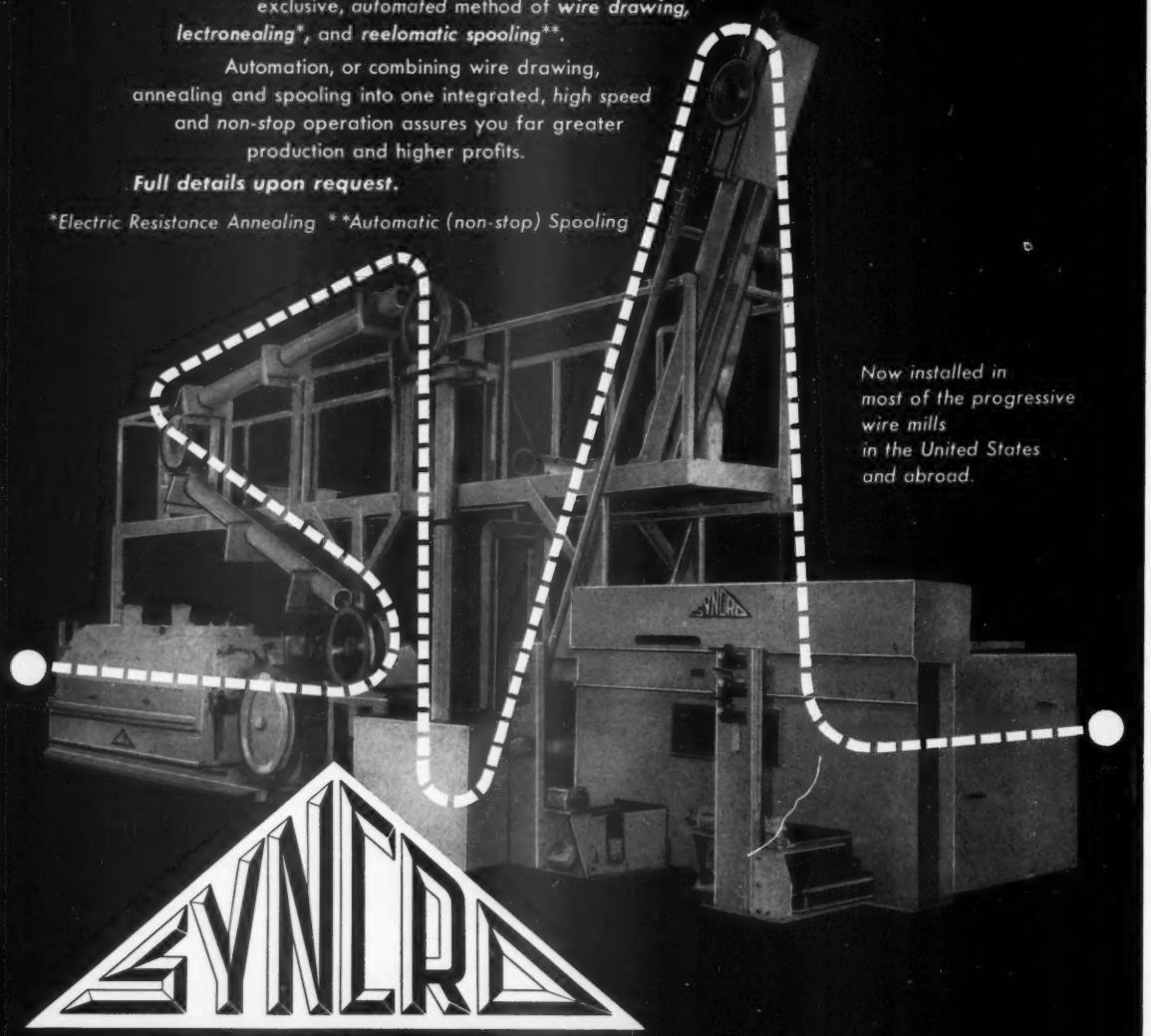

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Better Machinery for the Wire Industry

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Perth Amboy, New Jersey, U.S.A. affiliated company, WINGET-SYNCRO Ltd., Rochester, Kent, England

WIRE AND WIRE PRODUCTS*

Reg. U. S. Pat. Off.

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 30 August, 1955 No. 8

Designated as Official Publication By The Wire Association

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PB-120-T Box and Skid Unit equipped with tiering lugs.

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Boxes and Skids

For Handling Wire and Wire Products

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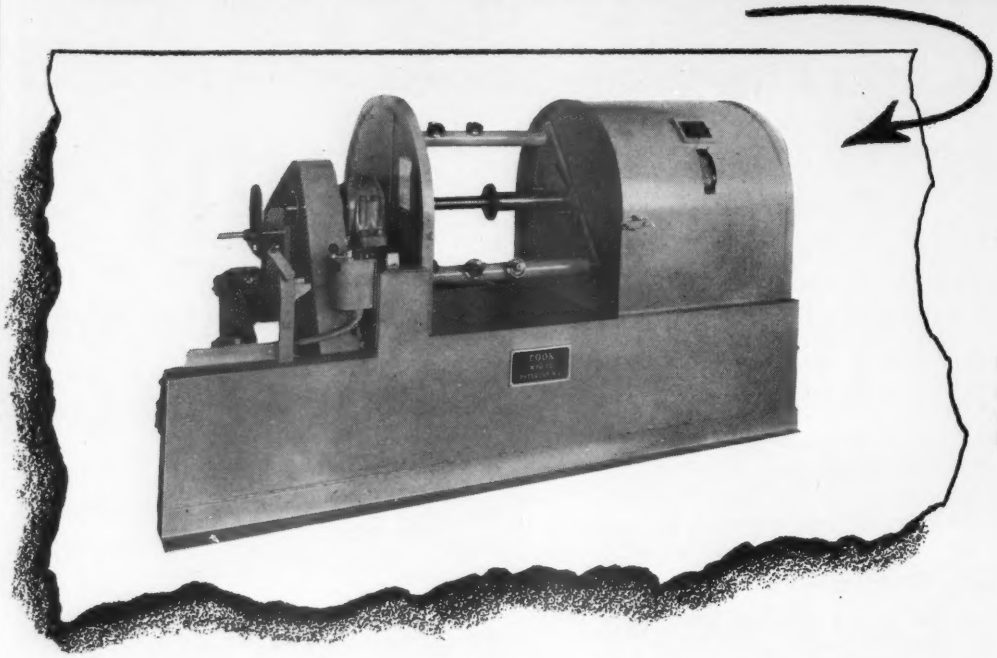
who want the best in BUNCHERS



NOTE:
A COOK BUNCHER-STRANDER IS 2 MACHINES IN ONE!

this hi-speed Bunch-Strander maintains concentricity

INCREASE PRODUCTION PRODUCT and PROFITS

- *Increased capacity—perfect concentricity*
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- *Adjustable traverse motion and speed changes to accommodate variances.*

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FLANGED STEEL DRUMS FOR REELS

for

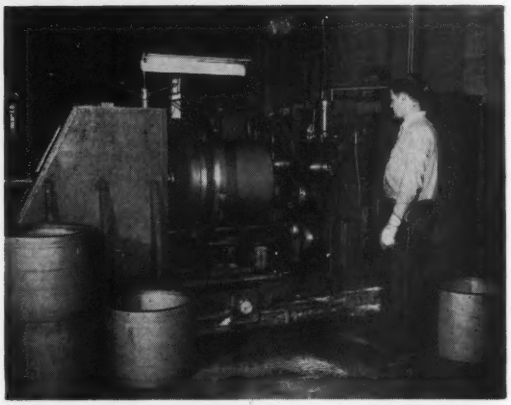
WIRE & CABLE . . . WIDE PORT

Plain finish . . .

Painted finish, or . . .

Galvanized finish (Hot dipped)

- **For use with nailed, plywood, metal bound and cast flanges. Made from a single sheet of metal—rolled—welded—flanged, with bolt holes punched to your specifications.**



SAVES COST in assembly of reel by eliminating handling of larger number of small parts.

SAVES COST by making repairs easy.

SAVES COST by increasing reel life.

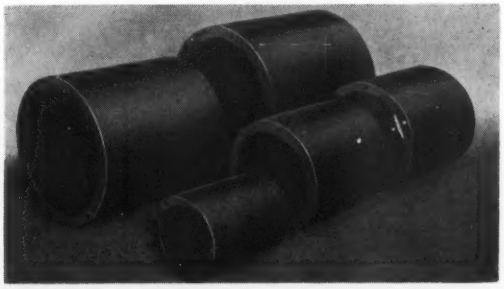
SAVES COST by reducing damage to wire and cable.

LATEST SEMI-AUTOMATIC FLANGING EQUIPMENT AND NEW GALVANIZING PROCEDURE MAKE POSSIBLE LOWEST UNIT COST.

Furnished in steel and aluminum—with flanged or plain ends.

Reinforced construction for heavy duty operations.

- **HUBBARD MAKES A COMPLETE LINE OF ALL STYLES OF FLANGES FOR USE WITH STEEL TRAVERSES.**



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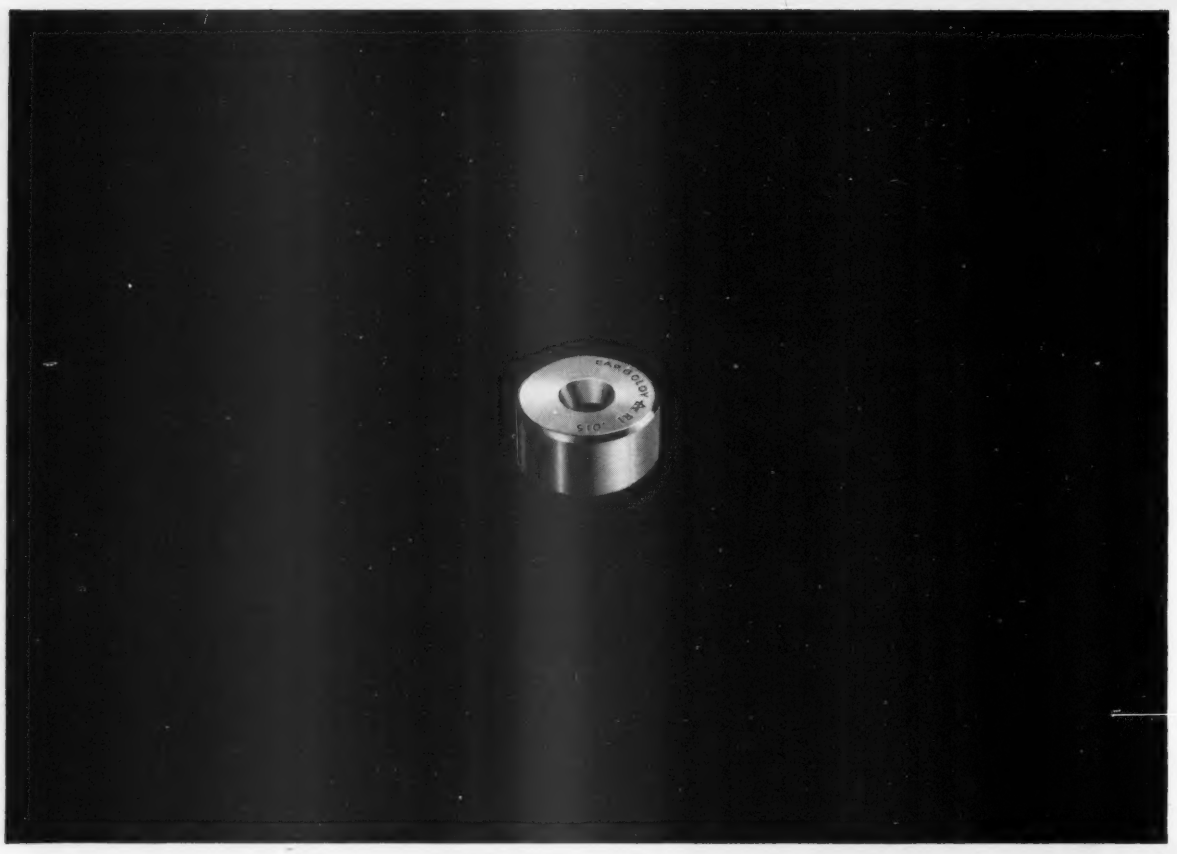

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Get full value from your carbide dies

Carboloy wire-die services help you increase drawing efficiency . . . reduce maintenance costs. These five services include:

1 *Training school* – instructs your die-room personnel in design, application, and maintenance of carbide dies.

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After completion of the tooling setup and adjustment of the several mecnanisms, you merely start the machine for fully automatic production.

Baird standard automatic Four-Slide Ribbon Metal Forming Machines are capable of producing thousands of shapes and sizes of products and components. In addition, various accessories, attachments, and special cams extend production possibilities to an uncountable quantity. The machine may be arranged to handle round wire if required.

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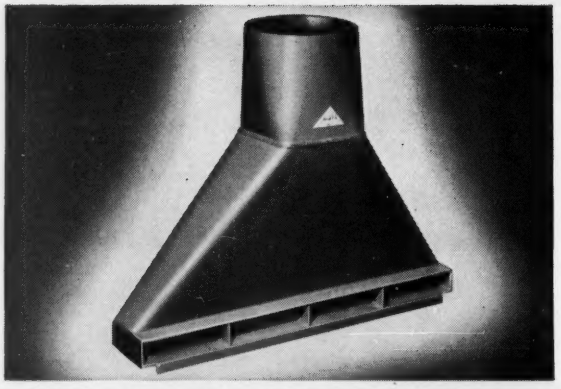
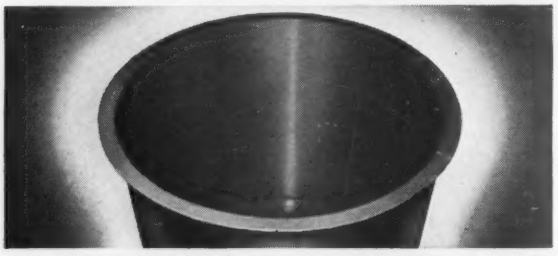
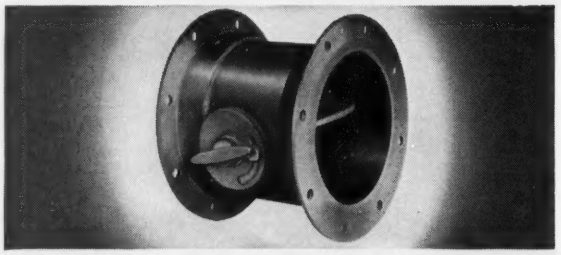


FUME DUCT MADE FROM HAVEG 1810 PVC is both low cost and planned to meet your system's needs. Haveg's Engineering Department works with you for simplicity of design, ease in shipping, installing, and maintaining.



HAVEG ALSO LINES TANKS WITH HAVEG 1810 PVC. Steel, wood or concrete tanks can be made serviceable, completely corrosion-resistant, with a tightly bonded PVC lining. Haveg uses a special PVC laminate, can do work in the field.



HAVEG FABRICATES PVC into special butterfly dampers that can be installed in either round or rectangular fume duct. Dampers are instantly adjustable and locked in place, contain few parts. Let Haveg make special items for you.

NEW, LOW COST CORROSION-RESISTANT EQUIPMENT

...made by HAVEG from Haveg 1810 POLYVINYL CHLORIDE

TRADE MARK REG. U. S. PAT. OFF.

Haveg, America's first molder of plastic corrosion-resistant equipment, now adds rigid, unplasticized polyvinyl chloride equipment . . . supplied in new Haveg Grade 1810 . . . to its complete line. The same Haveg fabricating skill, the same Haveg practical knowledge of corrosion engineering backs your order. Briefly, here is what Haveg has to offer:

CUSTOM FABRICATION of self-supporting tanks, steel tanks lined with PVC, complete fume removal systems from hood to weather cap. Haveg also makes angles and channel sections, troughs, flanges, pans, trays and dippers in Haveg 1810 PVC.

A trained Haveg engineer surveys your requirements, furnishes test samples, price and design information . . . tells you if PVC can save you money, help you fight corrosion better.

A COMPLETE INVENTORY OF STANDARD PVC ITEMS, ready for prompt delivery:

Sheet stock: in your choice of 144 x 44", or 72 x 44" size, in thicknesses of 1/16, 1/8, 3/16 and 1/4"; and in 60 x 48" size — 3/8, 1/2, 3/4 and 1" thick.

Bar stock: ten foot lengths from 1/4 to 2" diameters.

Pipe: Furnished in 1/2 to 6" diameters in 10 and 20' random lengths. Variety of ends, including plain, threaded, screwed flanged, welded flanged. Plain and socket-end PVC pipe is also made for cemented, or cemented and welded, installation. Complete line of pipe fittings are fabricated and stocked by Haveg. Maximum recommended working pressure for all pipe sizes: 25 psi at 75°F.

CHEMICAL RESISTANCE RATINGS show that Haveg 1810 has excellent resistance to acid attack, extending even to strong oxidizing acids in high concentrations. Resistance to alkalies and alkaline salts, as well as neutral and acid salts is very broad. With many organic compounds Haveg 1810 is completely satisfactory. Write for complete data.

OPERATING TEMPERATURES for most Haveg 1810 equipment is conservatively rated at 150°F. Remember, the complete line of Haveg equipment, including items using phenolic, furan, epoxy, polyester resins, now covers a working temperature range from 150 to 360°F.

WRITE FOR NEW HAVEG 1810 CATALOG which describes this new construction material, gives sizes and corrosion resistance information. Haveg gives you: Custom PVC fabrication. Complete stocks of standard items. Experienced corrosion engineering service. Design, engineering and installation skill. Call the Haveg engineer listed!

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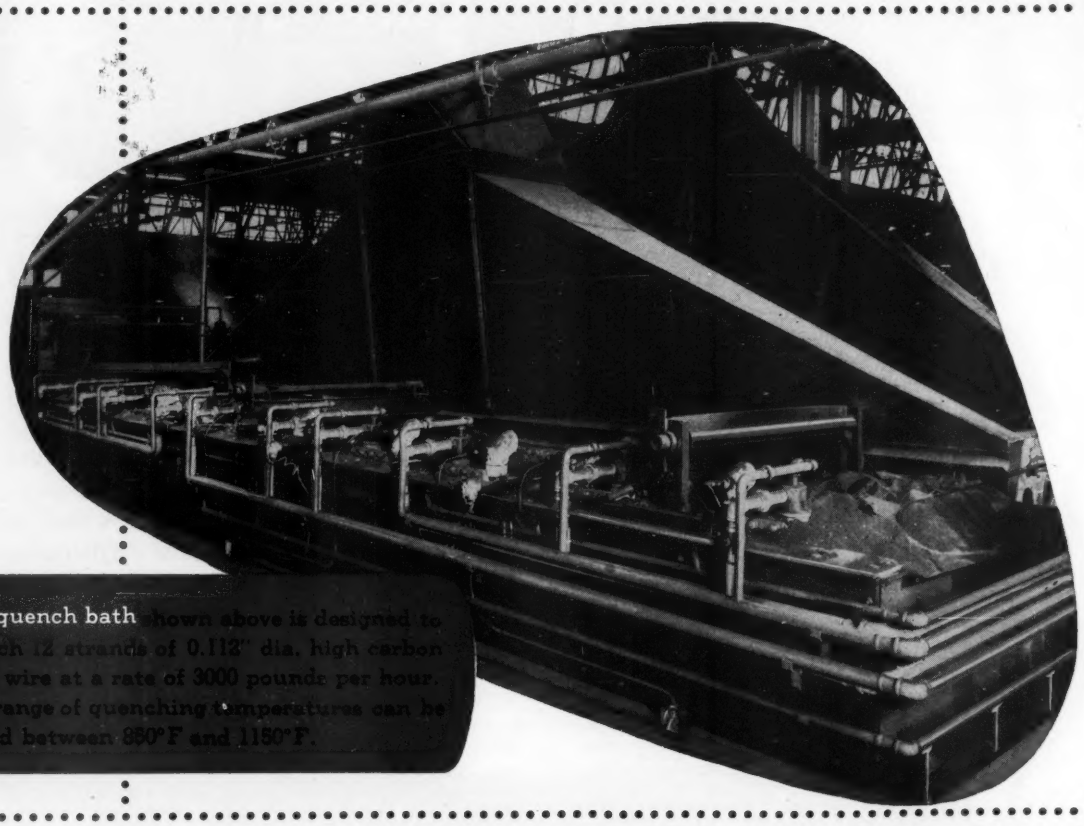
IMMERSION TUBE HEATED LEAD QUENCH FOR WIRE PATENTING

This 3-zone 30 ft. long gas-fired immersion tube heated lead quench forms part of a continuous patenting, cleaning and coating line for high carbon steel wires.

The multi-zoned lead quench is not only heated by gas-fired immersion tubes, but also utilizes the same immersion tubes with forced air cooling to maintain uniform temperatures throughout the bath. A specially designed control system automatically proportions the gas heating and/or air cooling of the tubes.



The quench bath shown above is designed to quench 12 strands of 0.112" dia. high carbon steel wire at a rate of 3000 pounds per hour. The range of quenching temperatures can be varied between 850°F and 1150°F.

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DREVER COMPANY — RED LION RD. and PHILMONT AVE., BETHAYRES, PA.

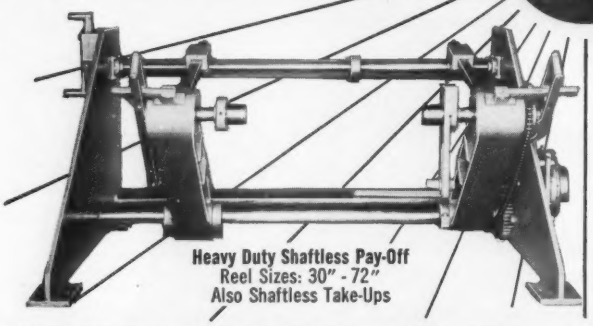
32

Model T-30
Take-Up or Re-Reeler

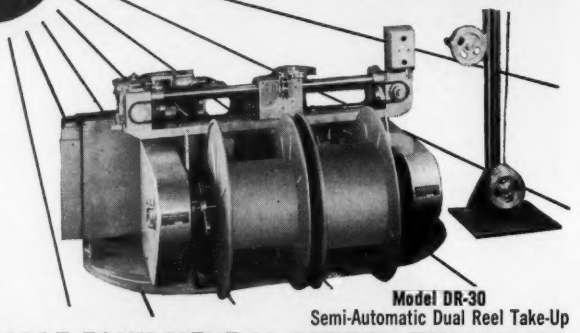
No. 4 Spark Tester
Automatic Resparking for Re-Reeling

CV Type Sparker
For Continuous Vulcanizing
or Plastic Extruding

FOR ACCURACY DAVIS WIRE & CABLE EQUIPMENT FOR DEPENDABILITY



Heavy Duty Shaftless Pay-Off
Reel Sizes: 30" - 72"
Also Shaftless Take-Ups



Model DR-30
Semi-Automatic Dual Reel Take-Up

THE NEWLY REDESIGNED *DAVIS WIRE & CABLE EQUIPMENT* IS BETTER THAN EVER

Modernized, streamlined and engineered for fast production of safely insulated wire and cable, the newly redesigned DAVIS ELECTRIC line of Spark Testers, Pay-Offs, Take-Ups, Counters, Spoolers, Traverses and Capstans is now offered as the finest ever conceived and produced by DAVIS ELECTRIC engineers. Before you buy, you owe it to your pocketbook as well as your business reputation to learn what this unexcelled machinery can do to better satisfy your customers (and your stockholders!). Refinements and advancement in designs qualify the 1955 DAVIS ELECTRIC line to surpass in performance previous DAVIS products in use in 80% of the industry's wire mills and some of which have been in operation for 15 years without maintenance problems!

What better tribute to quality can one ask?

Write for complete details and find out how DAVIS ELECTRIC can improve your wire and cable production and promote profit in your plant.

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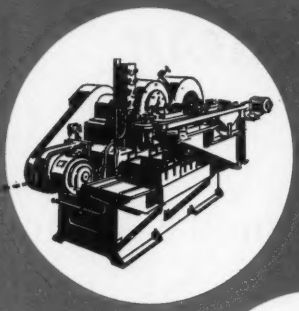
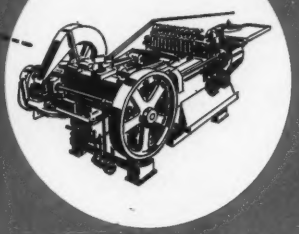
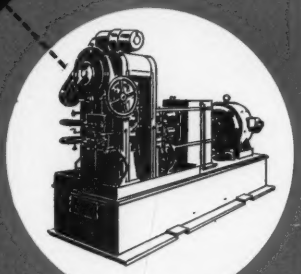
5 KINDS OF WATERBURY FARREL ANSWERS TO YOUR MASS PRODUCTION PROBLEMS



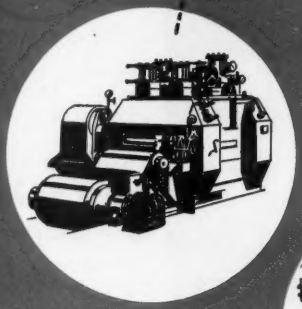
COLD PROCESS BOLT & NUT MACHINERY — Headers (all types) • Rivet Machinery • Trimmers • Thread Rolling Machines • Slotters • Nut Formers and Tappers, etc.



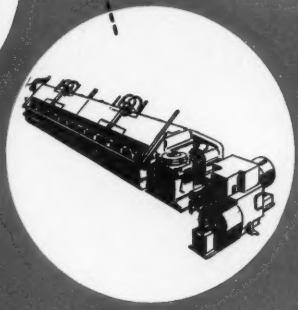
POWER PRESSES—Crank, Cam and Toggle; also Rack and Pinion Presses • Eyelet Machines • Multiple Plunger Presses • Horizontal and Hydraulic Presses, etc.



MILL MACHINERY — Rolling Mills: Strip, Rod, Wire Flattening. (For Ferrous and Non Ferrous Metals) • Also Slitters • Straighteners • Cut-off Saws • Coilers • Winders, etc.



SPECIAL MACHINERY — Sendzimir Mills • Small Arm Ammunition Machines • Collapsible Tube Machines • Coining Mills, etc.



WIRE MILL EQUIPMENT — Continuous Wire Drawing Machines (Upright Cone and Tandem) • Wire Flattening Mills • Chain Draw Benches • Pointers • Swagers • Bull Blocks • String-up • Machines • Spoolers, etc.

HERE'S A SAMPLE of Waterbury-Farrel mass production equipment in action. This complete WF automatic production unit combines a 40-ton double-acting, upright blanking and cupping press, a conveyor feed and four 7-station horizontal drawing presses to draw 340 zinc shells per minute.

Within These Basic WF Equipment Lines, Individual Machines Are Custom-Engineered For Specific Applications

If your metal-working machinery problem falls into any of these five groups, there are good reasons for looking to Waterbury Farrel for the answer.

There's Waterbury Farrel's continuing engineering research with more than a century of machine building experience to draw upon. This results in soundly designed and thoroughly tested features which improve production.

There's Waterbury Farrel's world-wide reputation for rugged, long-lasting construction. This gives you the assurance that WF machines are built to provide long years of uninterrupted production.

Waterbury Farrel can custom-engineer special equipment or adapt a standard machine to fit your specific problem.

For further information, write for free booklets on any of the machines mentioned on this page or contact your nearest WF office.

FOUNDED WATERBURY FARREL 1851

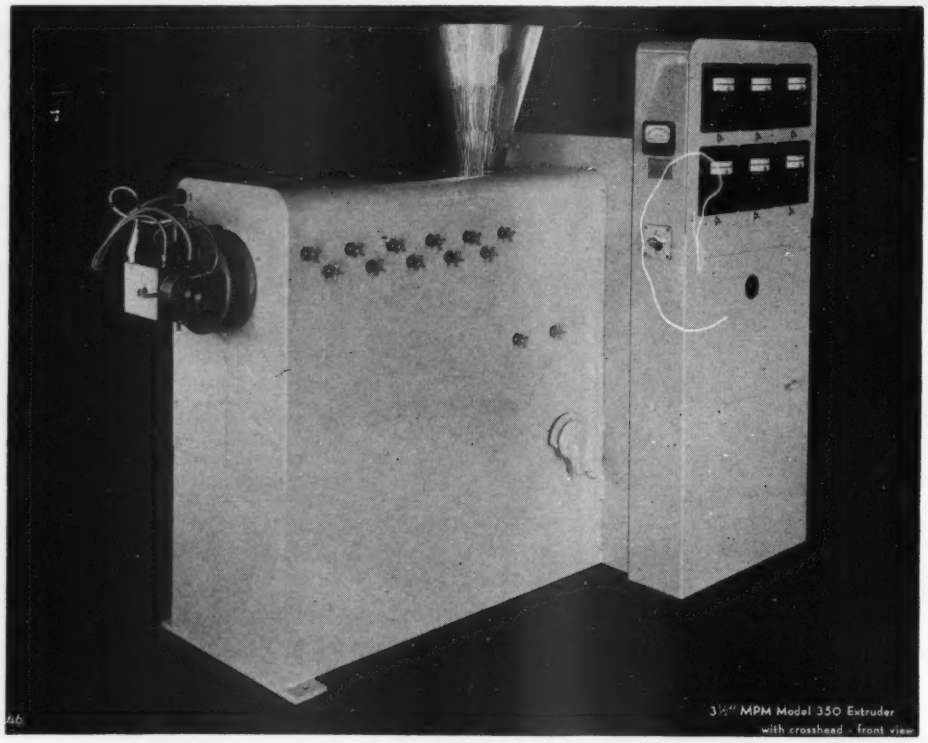
WATERBURY FARREL FOUNDRY & MACHINE CO. • WATERBURY, CONN.

Offices: Chicago, Cleveland and Millburn, N. J.

WF-7

"Modern" INSULATING EQUIPMENT

is designed for those electric wire manufacturers who demand the best in extruders.



Shown at left: 3½" MPM Model No. 350 Extruder with crosshead, front view.

MPM Extruders are used by nearly all material suppliers, by laboratories for quality testing, and for production. One large electric wire manufacturer now has 17 MPM Extruders-reorders for them indicate the satisfaction they give.

MPM Extruders have the utmost flexibility and will handle a wide range of compounds and cross sections, as they are equipped with the best in temperature controls.

Literature upon request with questionnaire to determine the sizes, types and production requirements. MPM equipment is used in all principal foreign countries, indicating flexibility with many compounds.

Complete line of accessory equipment, such as dual take-ups, capstans, spark testers, measuring units etc.

MODERN PLASTIC MACHINERY CORP.

15 UNION STREET • LODI, NEW JERSEY, U.S.A.

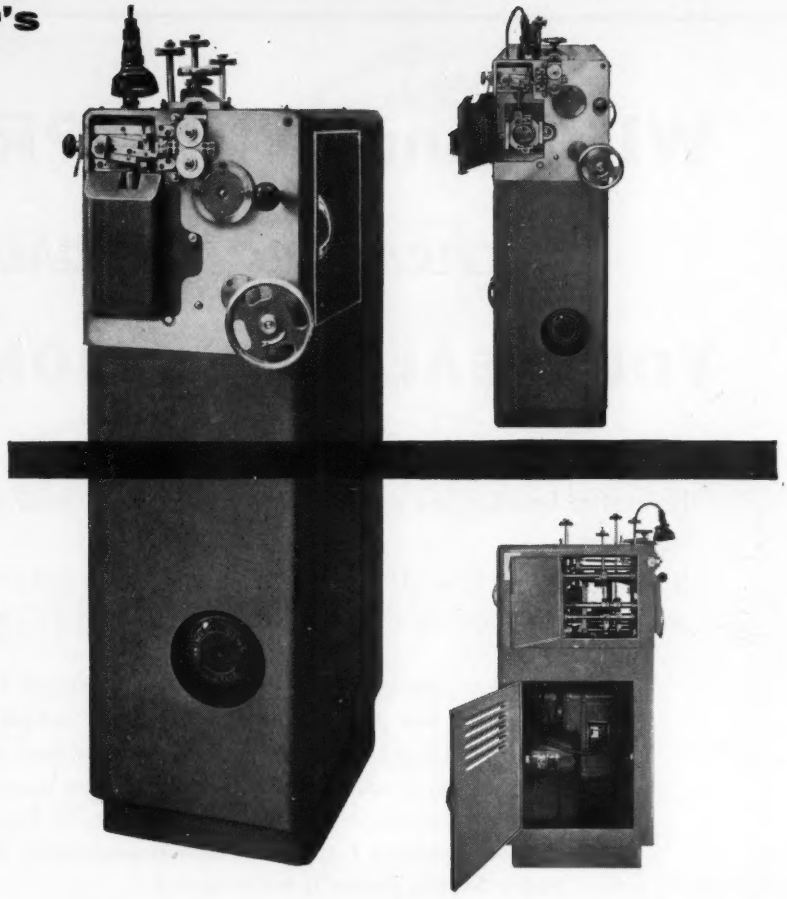
Telephone GRegory 3-6218

Springmaker's Delight!

.... Torrington's new W-10A

Based on the famous W-10 Spring Machine which has long been standard equipment throughout the industry, Torrington now offers the modernized W-10A Springmaker. This versatile, high-production machine includes many new features, all of which contribute to ease of set-up, correct location of controls, "clean" design and lower maintenance.

Read the specifications. Then call or write for further information on how the W-10A can be put to work in your plant to speed your production and reduce your costs.



SPECIFICATIONS

Wire Diameter Range	.008" to .028"
Wire Length Per Spring	0" to 24"
Coil Range (O.D.)	$\frac{1}{16}$" to $\frac{7}{8}$"
Production	24 to 243 with motorized variable speed transmission 21 to 240 with electronic adjustable speed drive
Drives	½ HP motorized variable speed transmission ¾ HP electronic adjustable speed drive
Extra Wire Feed Gears	0" to 36" of .008 to .024 diameter wire 0" to 48" of .008 to .020 diameter wire
Special Wire Feeds	0" to 6½" (using standard wire feed gears reversed)
Attachments Available	Torsion spring coiling mechanism, double diameter spring control mechanism, continuous coiling, 10 roll—2 plane-quick-opening ball bearing straightener, 5 roll—single plane—quick opening ball bearing straightener
Floor Space	21" front x 28" deep
Wire Line Height	48"
Weight	695 lbs.

THE
TORRINGTON
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

WIRE and WIRE PRODUCTS

reaches many prospects

YOUR SALESMEN DON'T KNOW!

No matter how big you are, the odds are you don't know all your actual prospective customers.

If your company is small, it is even more important to be "calling" on your prospects and customers regularly through advertising.

Your advertising in Wire and Wire Products will be seen by many people in the plants you wish to "sell" whom your salesmen never would see, yet who specify, actually buy or who influence decisions on products to be purchased. Your advertising is bound to be of immeasurable value to you, too, in paving the way for a good reception for your salesmen when they do call. And the field's buying power is tremendous!

WIRE AND WIRE PRODUCTS circulation, is all paid. We have no agents, offer no premiums or make special inducements to get circulation, except the value of the editorial contents in itself—yet our renewals have averaged 97% or better for many years. That's why it is a good and forceful advertising medium for all concerns who have products to sell to the wire industry.

- **GET YOUR SHARE OF THE BUSINESS . . .**
- **ADVERTISE IN WIRE AND WIRE PRODUCTS . . .**
- **SEND FOR ADVERTISING RATES TODAY . . .**

WIRE AND WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

think of... Kaiser Aluminum

To MEET the growing demands for aluminum rivets and threaded fasteners, Kaiser Aluminum produces for manufacturers a broad line of high quality rod and rivet wire.

Kaiser Aluminum wire is produced in sizes from 0.061″ to 0.374″ in diameter. Rod is produced in sizes from 0.615″ to 0.375″. Both are regularly available in six alloys: 1100, 2017, 2117, 2024, 6053, 5056. Others can be produced on request.

The many quality controls on Kaiser Aluminum rod and rivet wire assure rivets and fasteners that are strong, free from flaws and attractive in appearance—*that will meet or exceed minimum strength requirements.*

In addition to rivet wire and rod, Kaiser Aluminum also makes available a complete line of round drawn wire and hexagonal wire in a wide range of diameters, alloys and tempers. Redraw rod and redraw wire are available for further drawing into finished products.

For immediate attention to your needs, contact the Kaiser Aluminum sales office listed in your telephone directory. Kaiser Aluminum & Chemical Sales, Inc., *General Sales Office,* Palmolive Bldg., Chicago 11, Illinois; *Executive Office,* Kaiser Bldg., Oakland 12, Calif.

SCHUMAG AACHEN

GRAPHIK JUPP KLICKART7

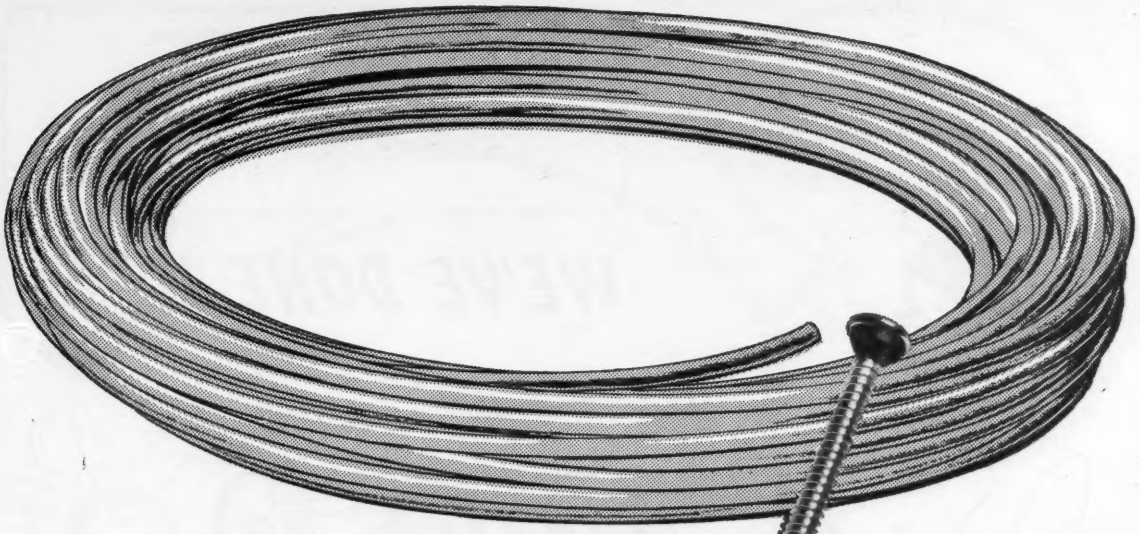
THE FOUR-IN-ONE CONTINUOUS BAR and ROD MAKING MACHINES

FROM A ROUGH COIL OF WIRE
TO STRAIGHTENED AND POLISHED BARS or RODS
BARS or RODS
Round, Square, Hexagon, Rectangular, Special Shapes
TUBING

Hundreds of "SCHUMAG" Continuous Bar or Rod Making Machines are today in most satisfactory operation in all industrial countries

Exclusive Representatives for USA, Canada & Mexico

AMERICAN LAUBSCHER CORPORATION
Fisk Bldg., 250 West 57th Street, New York 19, N. Y.



they grip tight...seal tight
—they're made of

CRUCIBLE
stainless steel cold heading wire

These *Tuff-Tite** fasteners, made by Townsend Company, New Brighton, Pa., have a neoprene washer preassembled into the head. They stop leaks... hold tight even where there's severe vibration... seal out moisture effectively.

Of course high speed production of these fasteners, like other types of screws, bolts, rivets and pins, demands cold heading wire with optimum workability. That means wire that's structurally sound and metallurgically uniform... with sufficient ductility to make forming easy... and with good tensile strength.

Crucible stainless steel cold heading wire has all these qualities — *plus* exceptional corrosion-resistance. That's why Crucible Types 305 and 410 stainless are used for the new *Tuff-Tite* fasteners, as well as for many other types of fasteners.

Crucible will fill your stainless cold heading wire needs quickly and efficiently... in the grade and size that best fits your application. Talk over your production requirements with your Crucible representative soon. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

*Trademark

Write now for your free copy of Crucible's new 32-page booklet on Rezistal stainless steel wire.

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

DURPON*

WIRE-DRAWING COMPOUNDS

last twice as long... yet cost no more!

We realize we're claiming a lot for Nopco Durpons. Perhaps the only men who believe it are the men who use Durpons. But they are the ones that matter.

There are two sound reasons for Durpon's profitable performance: All Durpon compounds contain: (1) a buffer, to maintain the pH level, keep the emulsion from breaking; (2) a sequestering agent, which holds the metal particles away from the effective drawing ingredients, *keeps the bath clean.*

Won't you be the next to try these high-performance compounds, and learn first-hand the economies they bring? Write today for technical bulletin and free working sample.

Nopco Chemical Co.,
336 Industrial St., Harrison, N. J.

"Stay Stable Longer"

DURPON—for intermediate gauge wire
DURPON L—for heavy wire, rods, and tubes
DURPON FW—for fine wire

NOPCO

*Reg. U.S. Pat. Off.

PLANTS: Harrison, N. J. • Cedartown, Ga. • Richmond, Calif.

Let us help you decide which COPPER ALLOY WIRE is best for your jobs!

Using the *right* copper alloy wire may cut your costs or result in a superior product—*or both!* Find out from us which wire is best for your needs. Just bring your problem to the experts at the Chase warehouse near you. Tell them what you want to do with the wire—and they'll recommend the perfect alloy.

It will be the best wire you can get anywhere. You'll find it remarkably clean and bright—uniform in texture, color and grain—precision tempered for consistent workability.

Chase copper alloy wire uncoils smoothly without twisting or tangling. No time wasted unsnarling *this* wire.

Order from your Chase wholesaler today!

NEW! Chase's informative wire and rod movie: "IN THE CHIPS." Arrange for a free loan of this film by contacting the Chase warehouse or sales office near you. Write on your company letterhead, today!

Call CHASE for STAINLESS STEEL, too!

Chase

BRASS & COPPER CO.

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

The Nation's Headquarters for Brass & Copper

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Boston	Dallas	Indianapolis	Newark	Providence	Waterbury
Charlotte†	Denver	Kansas City, Mo.	New Orleans	Rochester†	(†sales office only)

ALL ROLLING MILLS NOW USE Talide WORK ROLLS

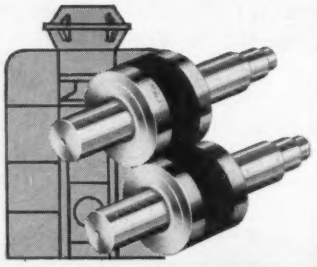
FOR EVERY TYPE FINISHING MILL

During the last five years Talide rolls have been adopted by every major strip steel producer. Metal Carbides pioneered and developed tungsten carbide rolls and successfully adapted them to all types of rolling mills including STECKEL, BLISS, UNITED, MESTA, STANAT, SENDZIMIR, WATERBURY-FARREL, TORRINGTON, RUESCH, FENN, WEAN, COLD METAL, etc.

Talide rolls have proven far superior to both steel rolls and carbide rolls of any other make.

168 to 7 hours

Leading Ohio strip steel producer averages 750 coils of various types and analyses between grinds, enabling them to operate their cold rolling mill continuously without roll changes for 7 days, 3 turns per day. Previous steel rolls used averaged 6-8 hours, necessitating 3 or 4 roll changes per day with considerable downtime.



210 to 5 days

Large Mid-Western producer of chrome-nickel alloy flat wire is averaging 7 months' continuous service between grinds compared to 5 days average run with steel rolls. Among other advantages, customer reports improved surface finish adds to sales appeal of finished product, fewer anneals are required to produce desired reduction, and wire runs cooler, resulting in less oxidation.

Talide work rolls are ultra-hard, extremely dense, and porous-free. Manufactured from highest purity tungsten carbide powders, the surface finish of a Talide roll is smoother than one micro-inch. Hard as a diamond, it will take a "bigger bite" than a steel roll. Strip steel of all analyses can be rolled down to thinner gauge, with more accuracy, greater reductions and with fewer anneals than possible with any other roll.

All users of Sendzimir rolling mills have adopted Talide work rolls because operating results have been phenomenal, far surpassing all expectations. The higher initial cost of Talide rolls is offset many times by the very substantial savings realized in less downtime, fewer regrinds, reduced scrap, reduced strain and stress load on back-up rolls, bearings and mill housings.

Tremendous production runs are commonplace with Talide rolls with mill after mill reporting increased tonnage-runs between roll changes of 278-1, 179-1, 82-1, etc. **Metal Carbides Corporation, Youngstown 7, Ohio.**

SPECIAL DIAMOND WHEEL for ROLL GRINDING

The Superset diamond grinding wheel was specially developed for grinding carbide rolls to highest possible surface finish and luster. Made of 4-8 micron size diamond dust, it imparts a surface finish far superior to any other commercial wheel. Available in sizes up to 25" diameter.

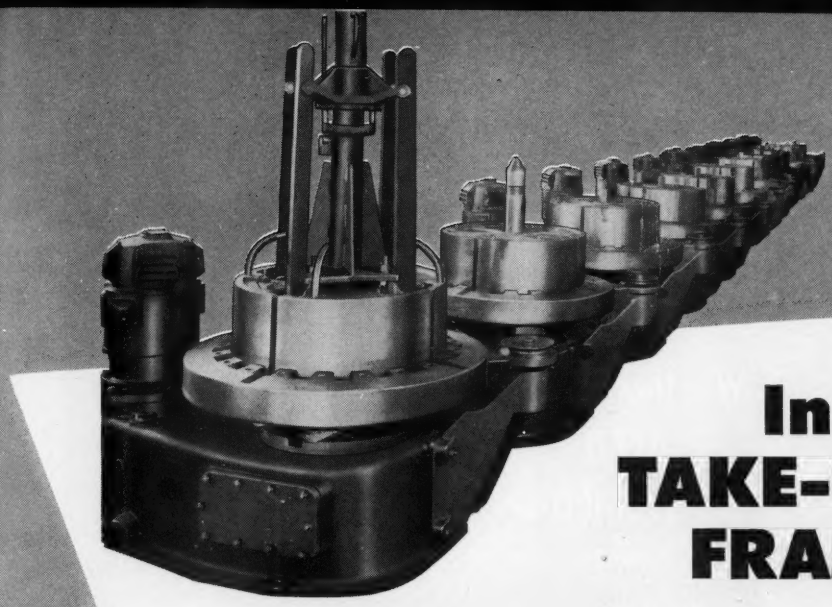
ROLL REPAIRING

Broken or damaged carbide rolls can be re-worked to first class condition with all defects eliminated at one-half original cost. Only Metal Carbides offers this service—because of its exclusive hot press method.

Send for new 84-page catalog 55-G

METAL CARBIDES CORPORATION
TALIDE®
YOUNGSTOWN 7, OHIO

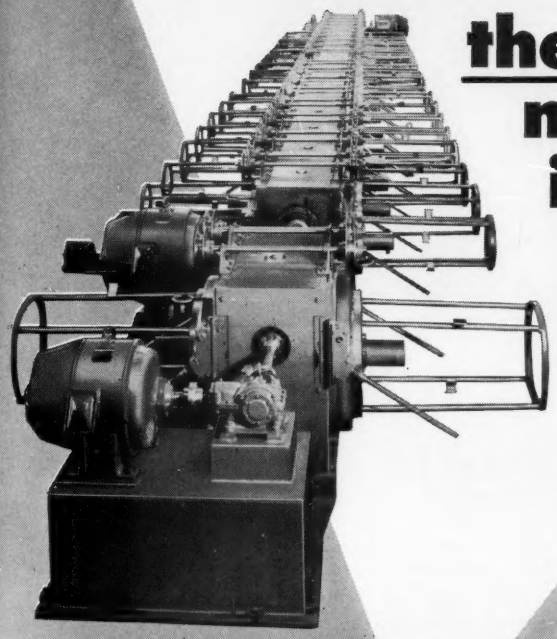
HOT PRESSED AND SINTERED CARBIDES · VACUUM METALS
HEAVY METAL · CERMETS · HIGH TEMPERATURE ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

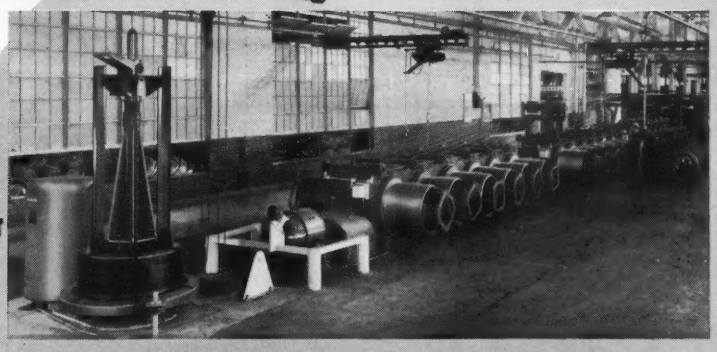


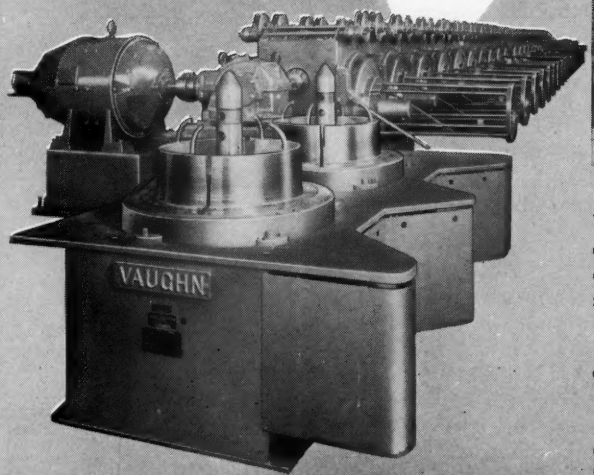
In TAKE-UP FRAMES

the name is-

Vaughn®







Vaughn Take-Up Frames incorporate the complete experience of the Vaughn organization in manufacturing wire drawing equipment of every type—to the most exacting standards of profitable performance for the customer. *We'll be glad to detail the advantages to you!*

The VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

...SWIFT'S SOAPS are the efficient lubricant for wire drawing

IMMEDIATE DELIVERY ON THESE QUALITY SOAPS...

- Powdered White Ribbon
- Guaranteed Powder
- Snap Heavy Duty Wire (Drawing Powder No. 282)
- No. 559 Powdered Soap

Whether it's used for chicken wire or cable, all wire has this in common: speed is profit; and with speed comes heat.

With increased heat, more draws and *less* cooling time between draws, a compromise with the quality of your drawing lubricant is a compromise with the efficiency you purchased in high speed equipment.

Swift's wire drawing lubricants are stable, efficient and dependable *because* they are produced to uncompromising standards of quality... standards established through constant attention to the specific needs of our many and varied customers. Included are an ever increasing number of specific soaps for specialized protection . . . a continually expanding, versatile line of products designed to help you make the *most* of high speeds, the *least* of heat and stress.

That's why your Swift man is a *single source* for resourceful service. 375 distribution points throughout the U. S. and Canada can provide prompt delivery and courteous service. Write for details and remember...

ONE TRIAL IS BETTER THAN A THOUSAND CLAIMS

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TO SERVE YOUR INDUSTRY BETTER

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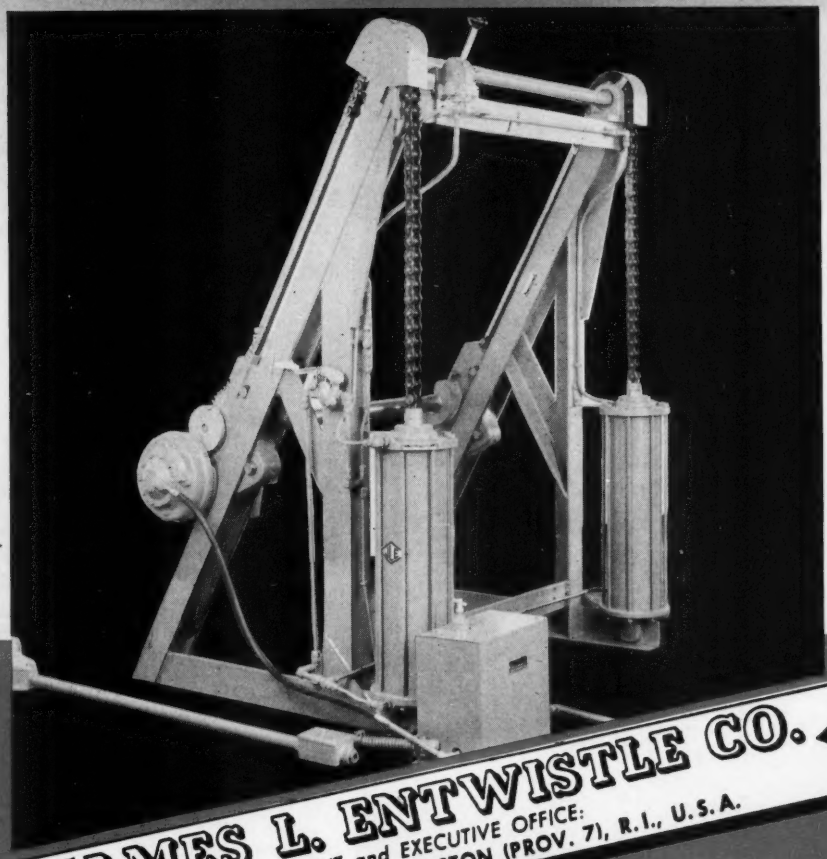
DESIGNERS OF WIRE MACHINERY



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PLANT and EXECUTIVE OFFICE:
1475 ELMWOOD AVE., CRANSTON (PROV. 71), R.I., U.S.A.

PAY-OFF REEL STAND — CLASS N

—A dependable, pneumatically operated Pay-Off Stand of proven rugged design—

Outstanding Features

Raising and lowering reels accomplished pneumatically with finger tip control and positive safety latch.

Five models available accommodating reel diameters from 18 to 90 inches.

Handles reel weights from 600 to 25,000 pounds.

(Shown Type N48D8A)

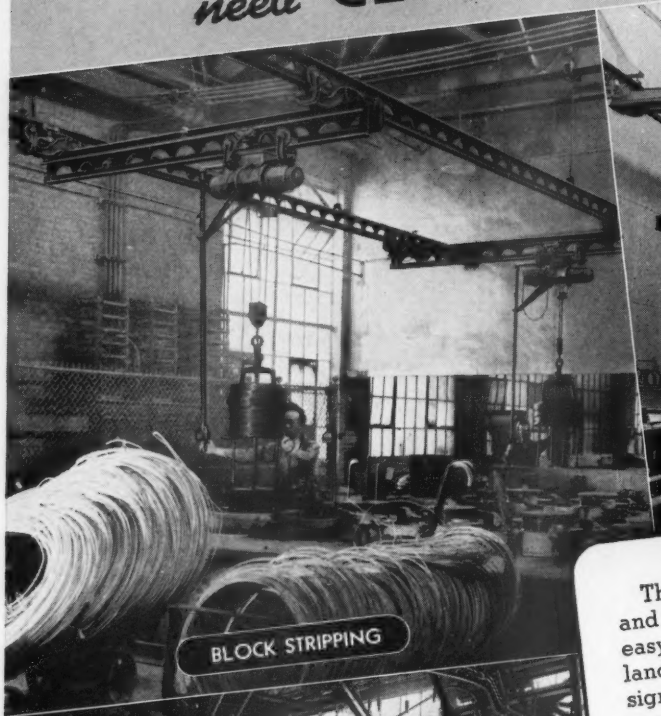
Economical operation resulting from low maintenance requirements.

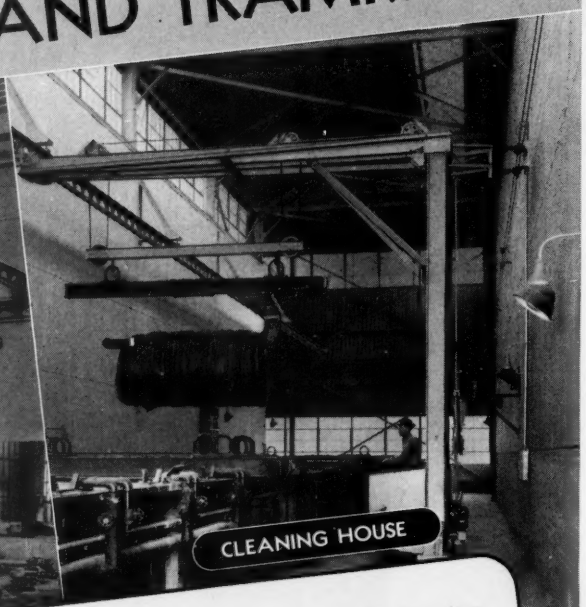
Supplied with following options to customer's requirements:

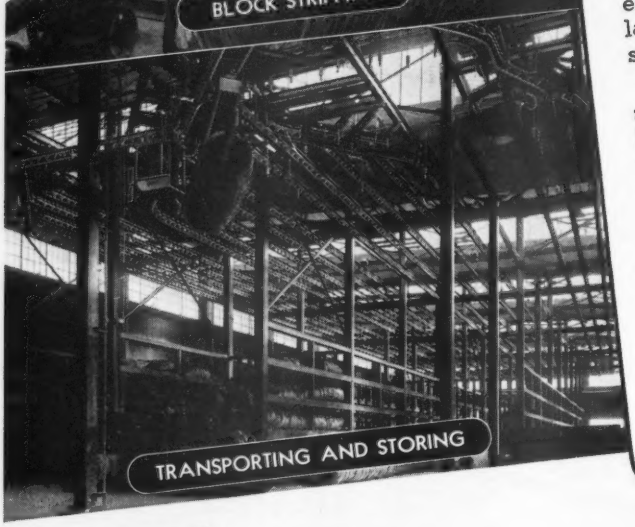
1. Free running
2. Adjustable Mechanical Drag
3. Adjustable Pneumatic Drag
4. Pneumatic Brake w/Mechanical Drag
5. Pneumatic Brake w/Constant Wire Tension

Ask for Catalogue 13A

ROD AND WIRE PLANTS *need* CLEVELAND TRAMRAIL







The hard work in the cleaning, drawing and handling of wire and rod has been made easy, fast and safe by application of Cleveland Tramrail equipment especially designed for the work.

Perhaps no other single factor has been so influential in increasing production and lowering costs in the wire or rod mill as properly designed and applied overhead materials handling equipment.

Today more producers and fabricators of wire and rod are enjoying the many advantages of Cleveland Tramrail than ever before and the list of prominent names in this industry is growing rapidly.

It costs you nothing to learn what Cleveland Tramrail can do for you, but it may be of tremendous importance in the immediate years ahead. Why not investigate now?

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
9209 EAST 288th STREET, WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Supermatic

SHAPE STRAIGHTENER AND CUT-OFF

Now! High speed, precision straightening of any wire shape—flats, squares, rectangles, oval, hexagon or special—on the Continental-Medart Supermatic Two-Plane Straightener and Cut-Off. Operation is fully automatic, push button controlled and production is approximately twice that to be expected of conventional straighteners.

Length gauge is electronically actuated and shearing is accomplished without pause. Four machine ranges offer straightening over the complete range from 1/16" to 1" sections regardless of shape. If your operations involve precision shapes, investigate the Continental-Medart *Supermatic* Two-Plane Straightener and Cut-Off.

Write **for descriptive bulletin 52AA or tell us your problem.**

CONTINENTAL BUILDING, 220 Grant Street, Pittsburgh 19, Pa.

Plants at
East Chicago, Ind. • Wheeling, W. Va. • Pittsburgh, Pa.
***Copes-Vulcan Division*, Erie, Pa.**

CONTINENTAL
Foundry & Machine Company

YOUR ADVERTISING in the

OCTOBER CONVENTION ISSUE of WIRE AND WIRE PRODUCTS IS MOST IMPORTANT TO YOU.

The 1955 Annual Convention of The Wire Association will be held in Chicago, November 14th through the 17th. For this event the October issue of WIRE AND WIRE PRODUCTS will be the Convention Issue—it is entirely devoted to the big event.

ADVERTISING IN THIS SPECIAL ISSUE PAYS

Because it carries pre-prints of technical papers, the program and other Convention features, it has exceptionally high reader-interest and long life.

Because the October Issue is so vital a part of the Convention activities, leading suppliers to the wire industry use it for special advertising messages, using more space than in regular issues.

Because it offers extra circulation—approximately 13%, it provides advertisers with extra values at no added cost. Rates are the same as in other issues.

YOU, TOO, CAN CAPITALIZE ON THE ADDED VALUES AND SPECIAL INTEREST IN THE OCTOBER ISSUE BY TAKING SPACE—OR MORE SPACE, IF YOU ARE AN ADVERTISER—IN THIS GREAT SPECIAL ISSUE. NOW IS THE TIME TO PLAN YOUR OCTOBER ADVERTISING AND ADVISE US OF YOUR WISHES.

Rates and details on request.

WIRE AND WIRE PRODUCTS

J. EDWARD DONNELLAN, Vice Pres.

•

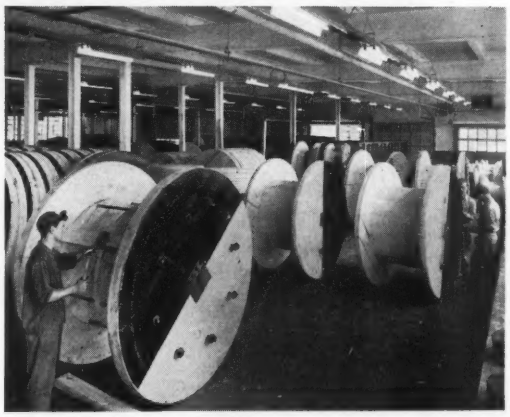
453 MAIN STREET **STAMFORD, CONN.**

Telephone: Davis 3-0482

ever STOP and think....

of what it costs $ annually to ship your Electrical Wire and Cable the old fashioned way?

NOW is the time to check and compare with the savings that can be realized by the use of NON-RETURNABLE wood shipping reels.



Look at these advantages:

- *Reduced Reel Investment*
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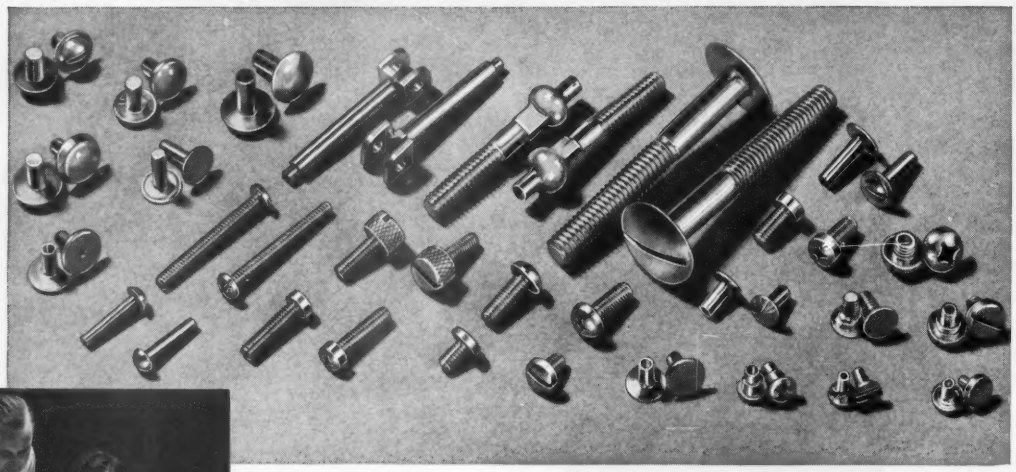

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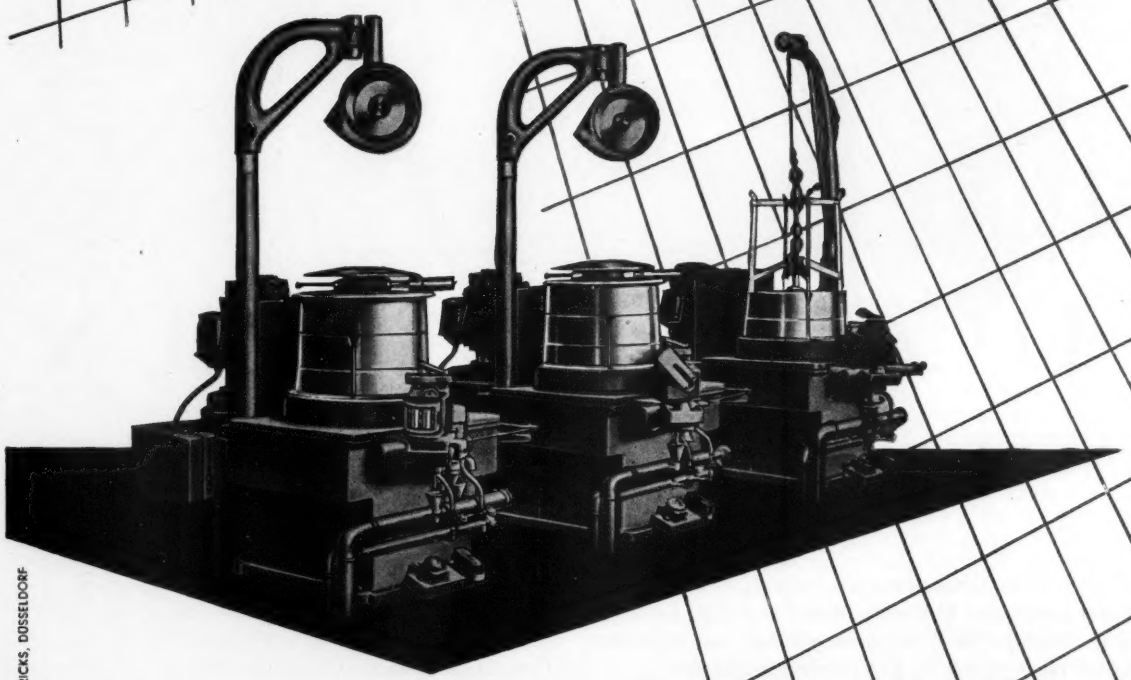

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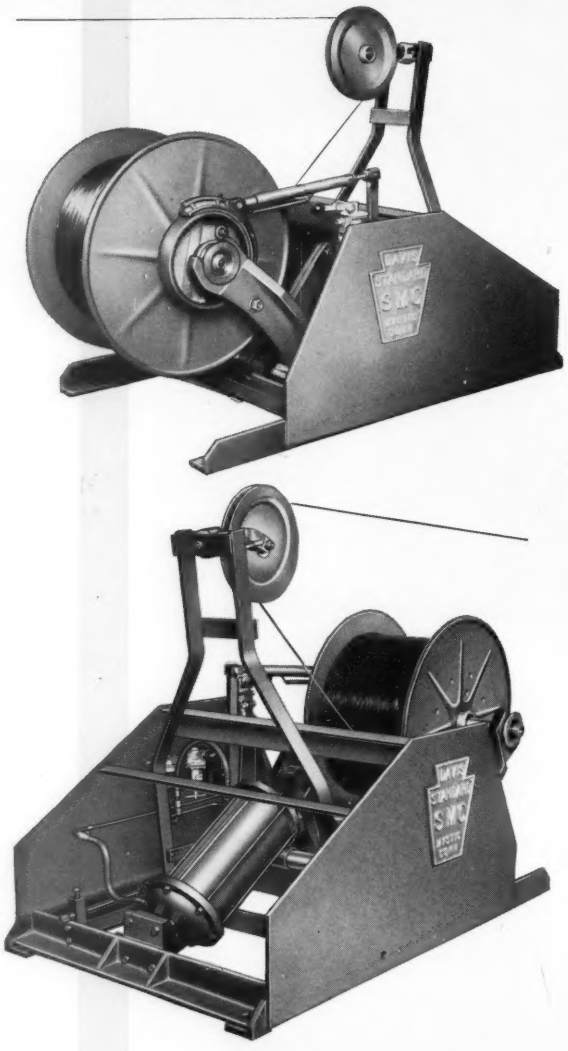

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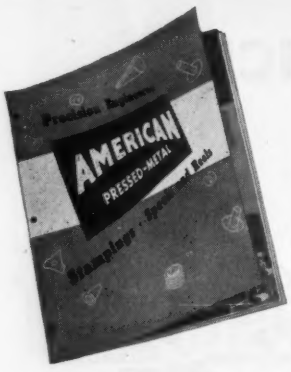

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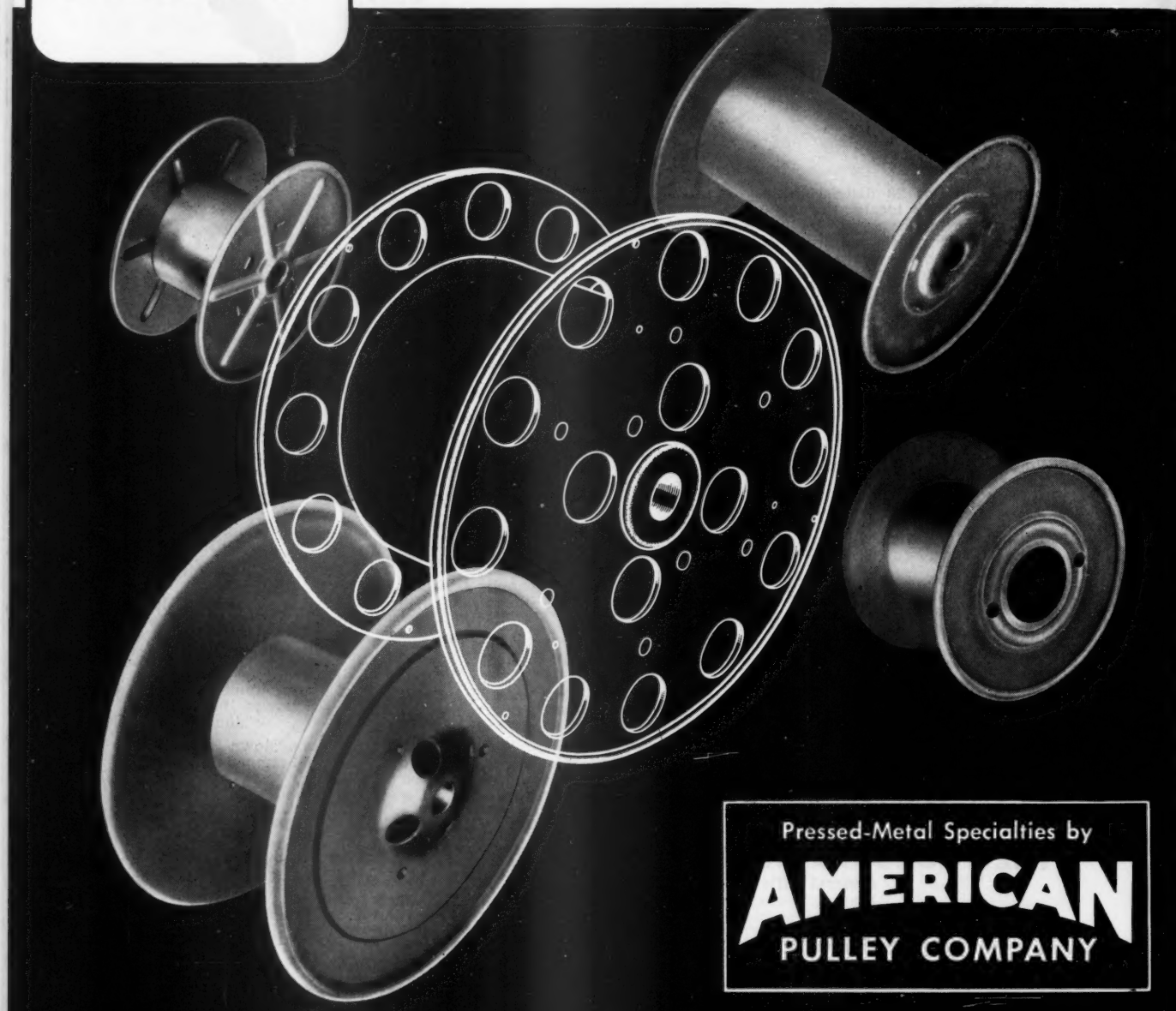

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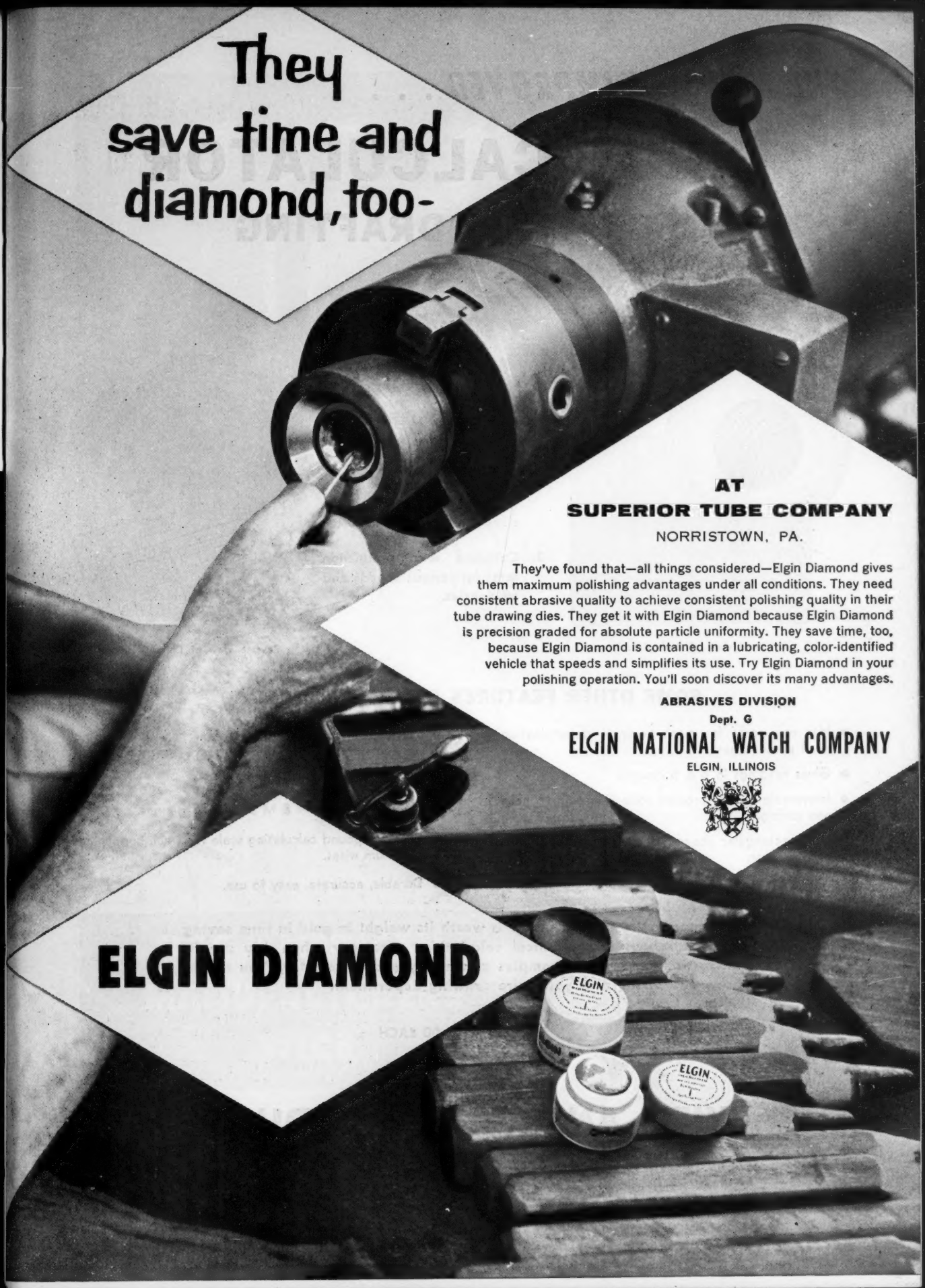
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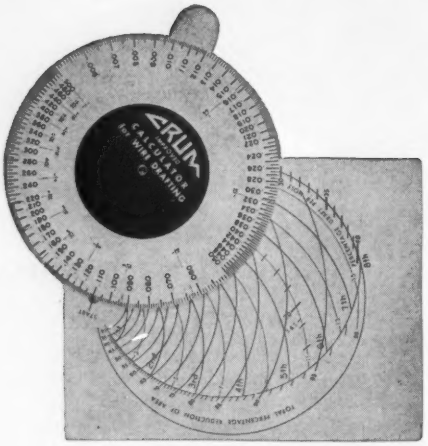
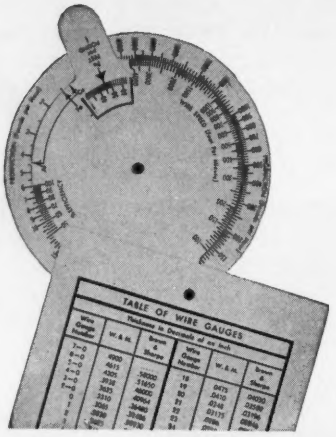


Front view of Crum Calculator.

THIS NEW DOUBLE-PURPOSE CALCULATOR WILL:

1. Provide quicker and more accurate information on die sizes and reduction areas;
2. Calculate wire production rates for various speeds and efficiencies.



Reverse view of Crum Calculator.

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- Durable, accurate, easy to use.

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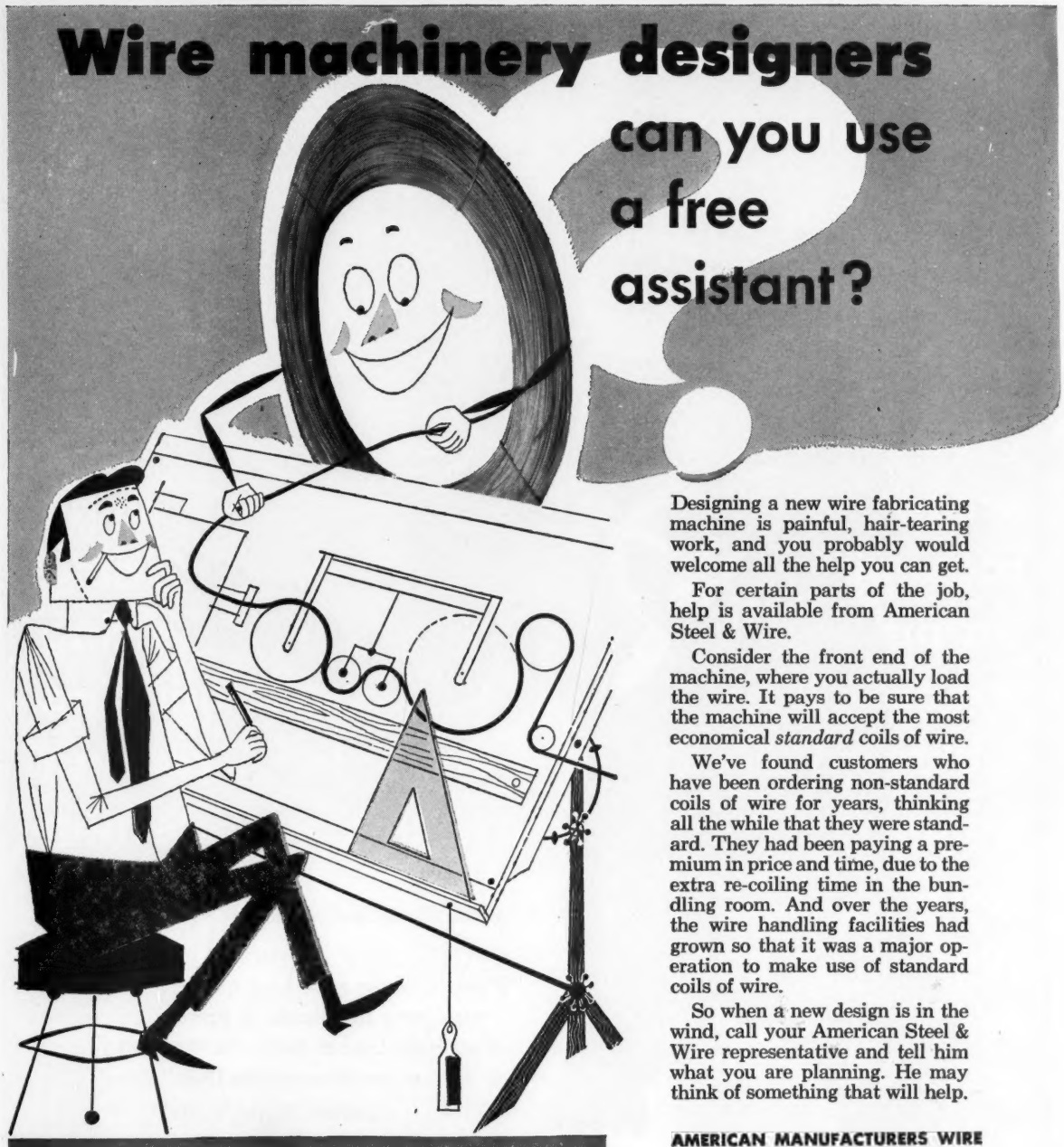

Designing a new wire fabricating machine is painful, hair-tearing work, and you probably would welcome all the help you can get.

For certain parts of the job, help is available from American Steel & Wire.

Consider the front end of the machine, where you actually load the wire. It pays to be sure that the machine will accept the most economical *standard* coils of wire.

We've found customers who have been ordering non-standard coils of wire for years, thinking all the while that they were standard. They had been paying a premium in price and time, due to the extra re-coiling time in the bundling room. And over the years, the wire handling facilities had grown so that it was a major operation to make use of standard coils of wire.

So when a new design is in the wind, call your American Steel & Wire representative and tell him what you are planning. He may think of something that will help.

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The Wire Outlook

Mid-summer is a good time for retrospection. Times are good and the season is relaxing. It is always comforting to feel assured that for the next few months, at least, business will boom along no matter what we do.

Yet this is hardly true. Most of us hope to be on the job and prospering for a long time. Hence, what we do today bears importantly on our welfare tomorrow. This calls for constant alertness in the conduct of our own affairs and in keeping a check-rein on our elected representatives in local, state and national governments.

Basically it is what the man in the street thinks and does that collectively determines the fate of a nation. Our country came into being and has flourished because of the principles of freedom and of action that are embodied in our constitution. The right to freedom of opinion and the dignity and importance of the individual were paramount in 1776 and should be now.

However, in 1932 a long series of evasions of the Constitution, the setting up of powerful bureaus whose actions were beyond the law, the packing of the Supreme Court, the entry of Government into business on a large scale in competition with private enterprise, etc., for all of which corrective measures are slowly being applied in spite of the conniving of left-wing elements, politicians and bureaucrats. For this we are paying a big price today. During this period there was a strong trend toward the easy way—letting the Government handle our destinies. There was also a tremendous growth in the strength of labor unionism.

This latter could have been a great constructive force for good had the quality of its leadership been on statesmanship levels. Unfortunately, it has been and still is anything but high-minded and enlightened. Possibly there are a few exceptions—not enough to stem unionism's pressure toward socialism, which stands for everything that is un-American and retrogressive.

Happily, during the last quarter century there has been a gradual spiritual awakening throughout the country. In this period, against a population growth of 31.47%, we have witnessed an increase in church membership of 90%. The country has benefited from amazing material and scientific achievements, with which the spiritual growth of its people has not kept pace. This evidence of a reaching out, for something more fundamental and better is an encouraging sign. The growing awareness that man shall not live by bread alone may well be the means by which civilization is to be preserved in this atomic age. A heightened consciousness of the universal brotherhood of man could leaven the world's body politics and lead to a happier estate for everyone. Walter Lippman in his recent book, The Public Philosophy, calls on the people of the United States "to reaffirm those positive precepts that a good citizen cannot deny or ignore, upon which our forefathers built the structure that has held our national life together despite every stress and strain."

The future welfare of the country, and indeed, of the world, rests in the hands of individuals. What shall it profit us to defeat the despotic oligarchies called Communism and to succumb ourselves to materialism, which in the end would lead to the death of democracy, freedom and prosperity.

Give us wisdom and vision!

—from the Editor's Desk

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Vol. 30 August, 1955 No. 8

Symposium on Aluminum Wire Drawing

William D. Bawden, Works Manager
The Gilbert and Bennett Manufacturing Company
Georgetown, Connecticut
Chairman of the Meeting

Aluminum Wire Drawing

by Roger J. Schoerner, Vice President
Southwire Company
Carrollton, Georgia

In addition to work we have been doing at our own mill, I contacted several other mills and suppliers to get their thoughts on items that they felt would be of interest in the field of "what's new in aluminum wire drawing" for this paper.

★ ★ ★

Good news travels fast and, knowing a little bit about the grapevine network existing in the wire trade, I felt reasonably certain everyone attending these meetings, and interested in aluminum wire drawing, would have heard of all these innovations to be discussed. Therefore, rather than feeling I would be offering anything new, I would much prefer to consider this a review and a consolidation of some of the things that have been discussed recently and most of all in an introductory talk for the papers that are to be given on dies, water soluble lubricants, dry lubricants, and filtering systems.

Roger J. Schoerner

This paper was the first of five papers comprising the Symposium presented before the New York Regional Meeting of The Wire Association on April 29, 1955, in New York City. The others follow in sequence. Mr. Schoerner has been associated with the wire and cable industry for fifteen years, both in cost control and manufacturing supervision capacities. In 1950 he was one of the principles in the organization of the Southwire Company, which has grown to become one of the leading independent concerns in the manufacture of conductors for the transmission and distribution of electricity.

I felt it might be interesting to look at some of the overall aluminum wire drawing activities on a domestic and world-wide basis.

★ ★ ★

New advances in technology and controls, along with new revolutionary methods, have spurred imaginations around the world; and many small independent operations have sprung up. Just during the last five years wire mills have been built in India, Ireland, South Africa, Australia, Mexico, Spain, and the United States. By coincidence, the mill in India drew wire on March 23, 1950, which was the same date wire was first drawn at Southwire Company.

★ ★ ★

Just what effect these mills will have on the overall distribution pattern and the development of aluminum wire drawing, I am sure is not yet ascertained; but we also can assume the effect of these mills will be a profound one.

In an attempt to give some continuity to this paper, it is being broken down into the following general topics: Rod Mills, Welding, Wire Drawing, Alloys and Specifications. Since the other papers on this program will cover die design, lubrication, and filtering, they will be touched very lightly here.

★ ★ ★

If there were to be any one key word indicated as most significant in the theme of this paper, I would say that this word would be control.

★ ★ ★

There is basically nothing new in any of the innovations to be discussed. The main thing that makes them different at all is the attempt at and success in more comprehensive and exact controls.

★ ★ ★

Let's then look in a little more detail at the subject of rod mills. Relatively few years ago, aluminum rods were made only on the various large and costly rod mills. Either the loop type or the more modern tandem mills. Now, there is available on the market a variety of rod mills to accommodate nearly all requirements of any wire mill. These vary in size from 1200 pounds per hour capacity on up. This diversified rod producing equipment is mainly made possible by new control methods.

★ ★ ★

We at Southwire have been very successfully operating a Properzi mill for approximately two years. The features that make this mill so outstanding generally results from its compactness and from its continuous operation. This, then, enables us to produce coils of very uniform properties since the temperatures and rolling conditions can be very closely held throughout entire coil production runs, and further can be varied to give various rod properties for specific end uses.

★ ★ ★

In general, the only limitation on the size package is the maximum that can be handled. Currently, packages are being produced up to 4,000 pounds. For those of you accustomed to thinking in terms of steel, this would be approximately a 12,000 pound continuous length of steel that can be delivered to the wire drawing machine practically tangle free with no further welding required.

★ ★ ★

Since coils produced on conventional type mills will average about 200 pounds, it is easy to note the material handling and welding saving is nearly in a ratio of 18 to one.

★ ★ ★

There is a considerable amount of work being done by many peoples the world over furthering the technology of continuous casting and rolling various forms with aluminum and its alloys. This is one of the fertile fields for further advancement with good experimental and development work. Results to date have been reassuring to the extent we can visualize that, with proper patience and controls, nearly anything can be accomplished by modification of the present processes.

★ ★ ★

So much for aluminum rod mills.

★ ★ ★

A review of aluminum welding brings to our attention several points of renewed interest. There have been so many papers written on the new Koldweld process that no attempt will be made to go into the details of this operation.

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Our own experimentations have been very successful and we have used Koldweld process on butt welding EC wire on our stranding machines and have experimented sufficiently with 56S to give us indications that there also is a possible use for this development in the rapidly growing 56S alloy screen wire program.

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You are, no doubt, keeping abreast of the advances made in the Koldweld pressure process. It appears to me that these developments and successes in this field are moving on at a much accelerated pace more recently.

The most spectacular results obtained by cold pressure welding of course have been in the electrical wire and cable field. Hand and power tools and equipment have now been built that will butt weld in a complete range from .020 to 5/8" rods; up to 1/8" diameter can be done with the hand powered tools.

★ ★ ★

Different metals such as copper and aluminum can now be butt welded together. Since a means of connecting the wires and cables on mixed copper and aluminum systems has long been a problem, this new development holds a tremendous potential.

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The copper sleeve is butt welded to the aluminum sleeve and the exposed weld covered with an insulating material which prevents excessive moisture to the weld area, thus avoiding the corrosive deterioration inevitable when the direct aluminum to copper contact becomes wet. Also, copper lugs have been welded to aluminum sleeves for inter-connecting aluminum systems and for connecting aluminum systems to the usual copper system terminations.

★ ★ ★

Cold pressure welding may soon be looked upon as a possible versatile and dependable method of joining other electrical metals to aluminum. We can expect it to play an important part in furthering the use of aluminum as an electrical conductor.

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While all this very fine work has been progressing with Koldweld, our company (and I am certain several others) have been furthering their experimental and production work with conventional electric butt welding methods. Three of these resistant type welding models are worthy of mention. The model AD3 Micro with a capacity of 3/16 through 3/8", and the model AD4 Micro with a capacity of 3/8" to 3/4" aluminum and aluminum alloys have proved most successful in our operation.

★ ★ ★

These welders produce uniform

results that we heretofore had thought impossible. Here again, the key word is controls. Those of you who have adjusted J type welders for heat, pressure, and distance of travel by the trial and error method will appreciate the merits of these new models. The AD model welders were primarily designed for welding aluminum alloy and other non-ferrous hard-to-weld materials which demand a higher upset pressure than regular EC aluminum. The AD welders are equipped with 2-stage air upset mechanism to assure maximum upset pressure. To counteract this high upset forging pressure, it was also necessary to equip the clamping mechanism for air operation to prevent slippage of the material during the push-up cycle. This was accomplished with much larger dies and die shoes. We have found that this machine is designed and built so that absolute uniformity of welds can be obtained by an inexperienced operator. I have on the table for your examination a few sample welds if you have further interest in this equipment.

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There also has been a considerable amount of work done with the model SEMT butt welder for aluminum alloy wire in the size range of .005 to .020" diameter, and the model ACMT for the same type wire in the range of .013 to .064 diameter wire. Here again, the adaptation is best fitted for the 56S screen wire program. Both welders are identical in appearance and operation—the difference in the two being in the power supply. The SEMT (stored energy meter type) is equipped with a stored energy power supply DC operated from a standard AC transformer while the ACMT welder is equipped with straight AC power supply.

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In wire drawing operations, all the new interest seems to be focused in two directions. First, further increased speeds; and, second, continuity of operation.

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Here again, the large diameter coils produced by continuous casting type rod mills result in a slower payoff speed and have considerably increased the permissible payoff rates. Wire drawing speeds of 5,000′ per minute in both coarse and fine wire have become very common, and equipment capable of speeds up to 7500′ per minute are proving practical and economical in several instances at the present time.

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Continuous bobbin takeup units for wire drawing and continuous drawing on blocks are both being offered as a means of further reducing the cost of aluminum wire drawing to better its competitive position in the wire market.

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In connection with continuously taking up of wire there is a very interesting project under way combining the continuous annealing equipment for adaptation for the 56S alclad program to anneal the 064 wire in connection with wire drawing.

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There continues to be very fine work done on the effect of wire drawing angles and bearings in the coarser sizes to speed, horsepower, and quality.

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The German wire magazine and our own Wire and Wire Products recently covered this work in some detail. I would recommend these articles to any of you who are currently working on this program.

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We, at first, felt that this work was not too significant in its value to our operation. However, the small amount of work that we have done indicates that here, too, is a fertile field for valuable cost reduction. Here is another case where control to a much finer degree than is generally employed in the industry will no doubt pay off.

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Rotating dies and no-slip machines are also coming in for further attention and renewed interest after a considerable lapse of time.

In the wire handling aspect of drawing, straight line and continuous flow of materials, use of cast aluminum and light metal spools, and ways and means of adapting the very versatile payoff pack to aluminum processing are being investigated by many companies.

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There has been so much interest in the drawing of aluminum screen wire that your program committee has requested special emphasis on this product.

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56S Alclad wire, more correctly now referred to as 5056 alloy, is by far the leading material currently being used. The other material also receiving a good bit of attention is the aluminum coated steel wire. There is an interesting article on this subject appearing in April Wire and Wire Products.

★ ★ ★

56S aluminum screen wire for fabrication into cloth is being produced by many methods. The most common is to draw ⅜" rod to .187 with four carbide dies. Again, many die designs are being used. The most common appears to be a design employing a 22 degree approach angle and a relatively short 25 to 30 per cent bearing with a very well rounded back relief. These carbide dies are generally lubricated with the heavy oil types circulated through the machine and then through one of many different type heat exchanges to keep the temperature under 120 degrees F. Most producers draw their .187 breakdown on spools at approximately 1200′ per minute. The .187 is then annealed for further drawing to .064 or, in some cases, .051. Annealing temperatures ranging from 660 to 700 degrees are used, and any type furnace that can give a uniform heating zone is apparently proving satisfactory. The bell-type circulating unit is perhaps most commonly used.

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It is interesting to note that some success has been made in

(*Please turn to page* 938)

Tungsten Carbide Die Design for Drawing Aluminum Rods and Wire

by Edgar T. Miller, Manager
Wire Die Sales
Firth Sterling, Inc.
Pittsburgh, Pennsylvania

Mr. Miller's paper was the second of the series comprising the Symposium on Aluminum Wire Drawing held on April 29, 1955, at the New York Regional Meeting of The Wire Association.

The physical properties of Aluminum are very disarming when carbide die design is to be considered. Due to the high ductility of the metal, one readily assumes that die design is of little consequence, while quite the contrary is true. Proper die design is essential if aluminum rod and wire are to be drawn successfully and economically. Whether the dies are used on finish wire of small size, intermediate drafts, or as a ripper dies for breaking down the rods, the same basic principles of good die design apply.

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As a guide to understanding some of these principles, let us consider the dies used primarily for drawing 3/8" diameter aluminum rods to finish wire sizes, 5 guage to 15 guage, at speeds ranging from 2,000 to 4,000 FPM.

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There are two fundamental rules that must be followed in selecting a die to do a specific job:

(a) Is it practical?
(b) Will it be economical?

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Aluminum has a few peculiar characteristics and it is necessary to consider them when selecting dies for this operation. Since dies are seldom, if ever, broken while drawing aluminum rod or wire, it is practical and advisable to select a die whose nib dimensions are such that it will be suitable for all the drawing operations beginning with the finish wire size and later be used successively on the preceding operations and eventually as a ripper die for rod breakdown.

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In drawing steel wire, it is difficult to define and qualify entrance angles and bearing lengths to finite values. Entrance angles ranging from 8° to 28° included with bearing lengths from zero to 120% may be used. However, in drawing aluminum wire, a 16° angle on dies up to and including .230" diameter is strongly recommended and almost universally used. Larger than .230" diameter hole

Figure 1

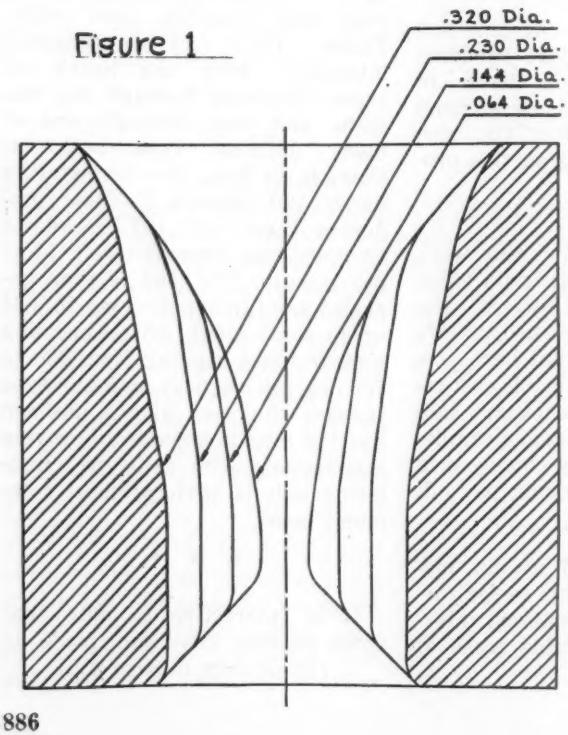
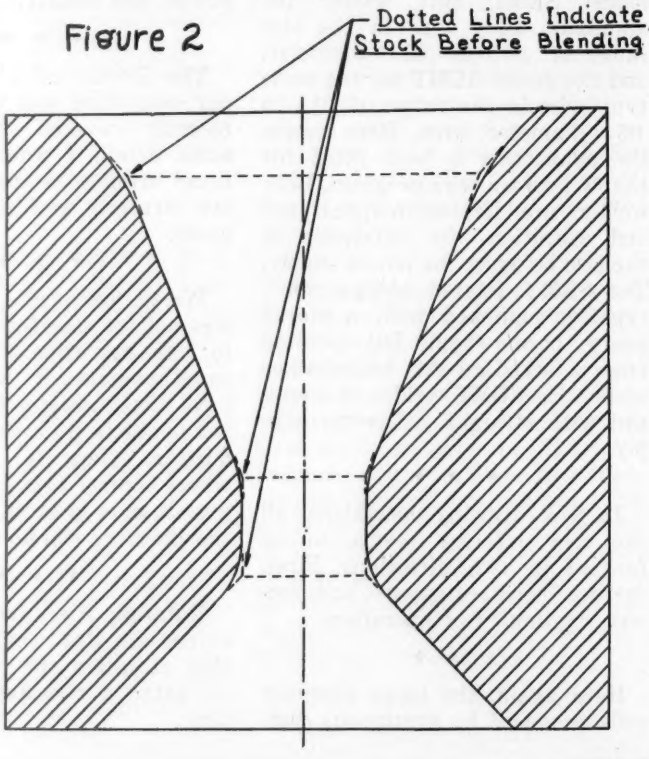


Figure 2



dies should have a 24° included angle. These specifications are held in general agreement among aluminum manufacturers and fabricators. Bearing lengths vary according to the diameter of the dies. Inasmuch as we are considering a specific problem, our recommendation for bearing length is 75% to 100% of the drawn diameter well blended with the angle.

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The industry standard nib designated R-6 as shown in Figure 1, is a natural and ideal selection for this job. It has an .040″ diameter rough cored hole, is .700″ high and .710″ in diameter. The R-6 nib has an entrance angle long enough to provide the necessary lubrication well and can be set in a steel casing that will conveniently fit into the rod machines. The die can also be made with a bearing of sufficient length to permit polishing the wear ring out of the entrance angle as often as is necessary, before the die wears oversize. Such polishing can be accomplished without detrimentally influencing die performance. This is an extremely important point since a wear ring develops in the entrance angle long before bearing wear occurs.

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Tungsten carbide drawing dies seldom wear oversize. Die life is generally determined by the ability to maintain necessary bearing length which is reduced as the entrance angles are polished.

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The golden rule of die design for drawing aluminum rod or wire is:

"All working surfaces of the die must be absolutely free of any surface imperfection otherwise a scratched or marred finish will be produced on the aluminum wire. The drawing contour must be perfectly blended at all intersections including the junction of the bell, entrance, bearing, and relief. The blending of the junction between the entrance angle and the bearing is of utmost importance. When this is properly done it is difficult to detect by eye where the entrance angle ends and the bearing begins." See Figure 2.

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This blending necessitates a die with a long bearing and is another reason why the R-6 die is ideal for this purpose. A generous, well-rounded back relief is a very necessary part of the die.

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The surface finish requirement for the working portion of the wire drawing dies has been the subject of considerable debate, without the establishing of any standards. However, in the drawing of aluminum wire, the finest finish obtainable on the drawing surface is mandatory. To secure a satisfactory mirror finish on the die draw surface, it is necessary to polish the dies using a progressively finer grit diamond dust. For purposes of classification the diamond dust for wire die polishing is generally rated: coarse, medium, fine and super fine. The coarse represents approximate 35-50 micron size range, the medium approximate 20-35 micron size range, the fine approximate 10-20 micron size range and the super fine approximate 5-10 micron size range.

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Die maintenance is extremely important in drawing aluminum wire. Any irregularity in the entrance angle interferes with the smooth flow of the metal and traps the lubrication which should flow through the die as the material is drawn.

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How often should the die be polished? Due to the production requirements and the high speed at which aluminum wire is drawn, a set of dies may be replaced in a machine many times because of changing product requirements. It is recommended that the dies be cleaned and examined each time they come into the die room. The die man can then determine whether or not the dies need polishing.

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It is difficult to determine die performance from a tonnage standpoint since tonnage records are generally lost long before the dies wear oversize. One set of carbide dies on which performance records were kept drew 553,000 pounds of .1236″ diameter wire before wearing oversize.*

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In some cases tungsten carbide dies are being used in drawing .013″ aluminum screen wire. On finishing .013″ aluminum screen wire at 2500 FPM with tungsten carbide dies, 1200 to 1400 pounds of wire produced per finish die. There are also instances where this wire is drawn at 5000 FPM using tungsten carbide dies on the first ten holes and diamond dies on the last four holes with excellent results. Tungsten carbide dies used for this job were R-1 dies with the same contour as used in R-6 dies.

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By adhering to the above principles of die design, aluminum wire and rods can be easily and economically drawn with tungsten carbide dies.

* "Drawing Of Aluminum Wire" by J. S. Urbanik, Plant Superintendent, Kaiser Aluminum & Chemical Corporation; presented at Wire Association Convention, Pittsburgh, Pennsylvania, May 9, 1952.

READ

WIRE & WIRE PRODUCTS

A Monthly Publication

Devoted to the Production of

Wire, Rod and Strip Wire Products

and Insulated Wire and Cable

Aluminum Wire Drawing Lubricants

by William B. Bauzenberger, Sales Manager
Apex Alkali Products Company
Philadelphia, Pennsylvania

This paper was presented before the New York Regional Meeting of The Wire Association on April 28, 1955, as a part of the Symposium on Aluminum Wire Drawing.

The ever increasing demand for aluminum wire in the past few years has involved many wire mills, whom heretofore were completely unfamiliar with the cold working properties of this type of metal.

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For the most part, the conventional wire drawing equipment has been found most adequate in reducing aluminum from rod to fine wire. Block type and hooded 8-12 die-cone or tandem machines ranging in drawing speeds from 600 FPM on rod to as high as 5200 FPM on fine wire, have been found satisfactory.

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In the cold drawing of this metal, it is observed that the coherent oxide film does not serve as a lubricant carrier, as compared to the oxide formed on copper and steel, and as a result, serious frictional difficulties are encountered due to the high temperatures generated.

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Even though comparatively low die pressures are set up in the drawing operations, great internal heat is generated, resulting in the wide use of wet lubricants and coolants. In some cases, it has been found necessary to install special cooling systems in the high speed drawing of E. C. aluminum wire in order to keep the metal more ductile.

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For the most part, the manufacturers of fine aluminum wire have been employing straight petroleum oils, fortified with extreme pressure additives, with excellent results. However, with the increasingly greater demand for higher production speeds, this form of lubrication might well become inadequate, and result in a trend toward the use of emulsions and aqueous solutions, to provide greater cooling. This same trend has come about and found most effective in the drawing of aluminum tubing.

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There have been many types of lubricants used in drawing aluminum, particularly in the rod breakdown passes, but none seem to have been accepted as universal practice and thus vary from mill to mill.

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Greases are used extensively on low speed machines not equipped with wet lubrication systems, and have been found satisfactory in most respects. Soap base and petrolatum greases in light rolling consistencies are used in the rod breakdown passes, and it has been found that a number of the mills blend their own greases to give better drawing results and increased die life.

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Neutral dry soaps alone have also been used, and are quite effective lubricants, but are not generally used because of their tendency to cling to the wire, thus preventing the desired polishing action of the die, resulting in dull finishes. Extreme caution should be exercised when using straight soaps and greases, as the residual lubricants left on the wire will cause discoloration in subsequent annealing.

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With heavy gauge wire, die pressures are sufficiently high to require the use of a heavy viscosity oil, in order to provide the necessary film strength to eliminate die pickup and scratching. Petroleum oils having a viscosity of 2500 to 3000 SSU at 100 degrees F are used in the drawing of aluminum, starting from 3/8″ rod down to and including the intermediate sizes. The finer sizes of wire drawn down to .008″ require a lighter oil of 100 SSU at 100 degrees F.

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Extreme pressure additives, in the form of fatty oils such as lard oil, are commonly used with the straight mineral oils to reduce the co-efficient of friction between the die and the wire being drawn, thus resulting in greater die life and the reduction of heat-generation. These fatty oils are usually added in proportions of between 5 and 10% by volume.

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Straight oil lubricants have the advantage of being readily obtainable, and free from corrosive action, but on the other hand, possess disadvantages that prompt all users to search for other means of lubrication in the hope that they might provide greater cooling, higher machine efficiency and cleaner working conditions.

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These conclusions have brought about the launching of a research program by the lubricant manufacturers to find suitable water miscible oil compounds for drawing fine aluminum, i.e., an emulsion type lubricant permitting greater drawing speeds, uniformity of finish, greater die life, and clean wire.

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Wire cleanliness is commanding more attention today among the screen cloth manufacturers, due to the importance of better paint adhesion, which in turn produces better corrosion resistance. A number of the screen cloth producers are presently cleaning, or are presently installing, cleaning facilities prior to the enamelling operations.

Presently there are two classes of water miscible lubricants: those comprised of suitable fats and fatty acids rendered emulsifiable by means of partial saponification, and secondly, petroleum sulphonates composed of mineral oils and emulsifiers coupled with other chemical substances to provide greater extreme pressure characteristics.

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There are several functional problems that must be minimized in formulating a water miscible aluminum wire drawing lubricant. It is a known fact that a chemical reaction takes place between aluminum and water itself, resulting in the heavy formation of oxide sludge in drawing.

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Aluminum oxide is formed on the metallic surface in the presence of water, and is drawn off as the wire passes through the die, thus causing excessive formation of a colloidal suspension, and may react with some of the basic ingredients of the lubricant. This continued reaction will eventually break down and lower the lubrication qualities of the emulsion. However, it is believed that these detrimental effects can be overcome by chemical treatment, and filtration. Properly designed lubricant reservoirs to allow for settling out of this sludge might also be considered.

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We find our European friends favor the use of water-emulsion type lubricants in preference to straight oils, although it is believed their drawing speeds are considerably lower than is the practice in this country.

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However, it is a known fact that higher drawing speeds can be achieved with the use of a water-emulsion lubricant due to the greater cooling properties of water itself.

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Over the years, many problems of this nature have faced the wire industry and only through the combined efforts and cooperation of industry and the lubricant manufacturers has a successful conclusion been reached, and it is the considered opinion of this speaker that a successful solution to this current problem is presently being worked out.

Some Comments on Dry Drawing of Aluminum Wire

by Chester F. Wickwire, Treasurer
Wickwire Brothers, Inc.
Cortland, New York

This paper was the fourth of the series comprising the Symposium on Aluminum Wire Drawing held during the New York Regional Meeting of The Wire Association in New York City on April 29, 1955.

Mr. Chairman and Gentlemen of The Wire Association: Last Friday Mr. Bawden called me and asked if I would give a short talk on the dry drawing of aluminum wire. I agreed, but asked that I be permitted to talk informally without any elaborate preparation.

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As with many of our friends in the screen wire business, our company finds that aluminum wire is rapidly increasing in popularity. We were faced with the problem of adapting our existing steel type wire drawing machinery to the drawing of 56S Alclad alloy aluminum material. Ours are all dry drawing machines of conventional style and require dry type lubricants. After many trials we have determined that an aluminum soap used in combination with grease to wet the wire in the first hole works best. This wetting is not necessary if the wire rod as rolled on the wire has a rough or etched surface to pick up the lubricants.

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The finish produced is not shiny and bright, but is a dull, gray, matte color. However, for further processing, this is no disadvantage and the lubricant film has a definite protective action on the wire during drawing, this film even surviving during annealing. With the often severe treatment given the wire on a steel type machine, this is a definite advantage. Handling the wire between drawing steps is not nearly so critical and the extreme care necessary with bright, bare wire is not required to so great an extent.

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The grease we use is manufactured by the Standard Oil Company of New York. They are extreme pressure grades, the numbers of which are PD949A and PD950A.

★ ★ ★

The first dry aluminum soap powder we used was made by Metasap Chemical Company. This material works well, but is so fine it blows around, particularly on air-cooled machines. Later, the Magnus Chemical Company developed their Dri-Draw #8, a granular type aluminum stearate. The R. H. Miller Company also manufactures an

(*Please turn to page* 940)

Filtration of Lubricants for Aluminum Wire Drawing

by H. T. Jones, Jr., Vice President
Hercules Filter Corporation
Hawthorne, New Jersey

Preparation of this paper has been based on factual reports obtained by Hercules sales engineers in cooperation with operating personnel in wire drawing plants where installation of Pressure Leaf Filters are actively in use. In some instances reference has been made of filter units that have been operating successfully for periods ranging from two to six years. This is fortunate in that we feel that data gained over such a span should lend credence to and substantiate the reliability of the observations to be stated hereafter. Of course, there are variables encountered depending on conditions existing in different plants. For this reason average figures will be used for the most part.

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As this report is concerned primarily with the filtration of lubricants the field of discussion is therefore more particularly concerned with mineral oils.

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As it is well known by you gentlemen in the Wire Industry, for many years the standard approach to lubrication of diamond dies in wire drawing has been done by the use of soluble oils which were selected for their cooling qualities as well as for the reason of lubrication. Partial disadvantages of soluble oils basically are as follows: Build up of fats in the equipment, eventual clogging of the jets, foaming, rusting of the equipment, and too frequent interruption of production for cleaning purposes. In addition, it is a fact that some mixtures or blends turn rancid and create unpleasant working conditions. In the main, these disadvantages result in high maintenance cost and, of course, production losses caused by equipment shut down in order to effect thorough cleaning and dirt removal.

H. T. Jones, Jr.

Mr. Jones graduated from Yale University in 1932. After five years with L. F. Rothchild & Co. and another five with the Texas Company in financial and sales capacities, he resigned to join the Hercules Filter Corporation, where he has been since in charge of the sales, coordination and treasury departments. He delivered this paper on April 29, 1955 as a part of the Symposium on Aluminum Wire at the New York Regional Meeting of The Wire Association in New York City.

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Primarily, for these reasons, in recent years many wire drawing companies have been turning to the obvious alternative, which is mineral oil used either with or without extreme pressure additives. It is true that these mineral oils eliminate many of the disadvantages of soluble oils, but it is also a fact that without sufficient E. P. additives or excellent clarity of filtration, they too, would have to be tagged with a number of disadvantages as follows:

(a) Lower heat conductivity
(b) Higher initial cost
(c) Having the property of suspending diamond and metal dust and other abrasive particles rather than allowing them to settle.

It was found and has been maintained that a mineral oil containing sufficient E. P. additive and having a sufficiently low viscosity and adequate heat conductivity, can be said to have eliminated the first of the above objections. In fact, it has definitely been shown that such treated mineral oil produces excellent results as to longer die life and cooling effect as represented by temperature of the wire drawing dies and thereby a most pronounced lack of burnt dies.

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The second and third disadvantages noted above, namely higher initial cost and removal of suspended solids, have been overcome by filtration, more specifically a system of Pressure Leaf Filtration, for the reasons, respectively, that the oil can be re-used over and over and that all suspended matter, abrasive or otherwise, is filtered out continuously.

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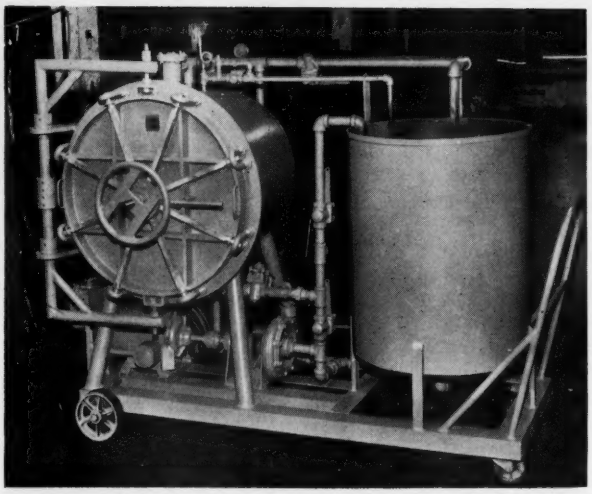
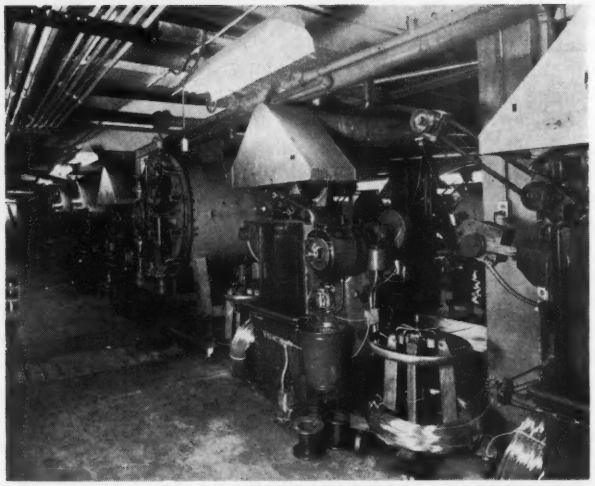
Before proceeding to enumerate the many specific advantages resulting from the use of the Pressure Leaf Filter system on these mineral oils, at this point, in order to give a better picture of the filtering operation itself, a typical filter unit, as normally installed for a wire drawing operation, is described.

Design

The Pressure Leaf Filter is simple in design. The filter container is a horizontal cylindrical tank with the filter leaves suspended vertically inside. A leaf unit consists of a frame enclosing a heavy mesh middle or center screen which gives rigid support to two finer-mesh screens on either side of it. Besides its supporting function, the heavy-mesh screen acts as a spacer for draining the liquid into the discharge channels, which are formed by placing several leaf



View of Hercules Model #12 (125 square feet of effective filtering area) Pressure Leaf Filter Unit, showing filter tank with quick opening door, pump and motor, precoat tank, and interconnecting piping. All mounted on common portable base.



Here is seen the Hercules Pressure Leaf Model No. 60 filter with 22 leaves (400 ft. ^{2}) together with some of the fifteen Vaughn CF-1 Ring-blox wire drawing machines oil for which it keeps pure and free from particles of metal and other foreign matter.

units together. These channels lead to a discharge manifold on the outside of the tank. Leaf units in a Pressure Leaf Filter are of uniform size and are interchangeable. Any number can be used together, from a minimum of one up to the maximum limit in a given standard sized model.

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For example, a Model #20 filter, which infers 200 sq. ft. of effective filtering area, has a full complement of 22 filter leaves. However, it can be operated with any lesser amount by merely substituting sleeve spacers for the leaves that would be eliminated. In other words, if it is estimated by the user that their production might increase at a future date, a larger tank size than initially required can be installed and then operate, let us say, with only the percentage of filter area necessary for their current production. To gain the additional area, as needed, it is only required that extra leaves be obtained and inserted to create a larger leaf bundle.

Operation

The Pressure Leaf Filter is easy to operate and requires no mechanical skill. To the unfiltered liquid in the precoat tank (see piping diagram) filter material is added and is mixed by pump recirculation without the use of agitators. The mixture is then recirculated through the filter tank where the material is gradually deposited on the leaves to form a precoat. This precoating operation takes only a few minutes before actual filtration starts.

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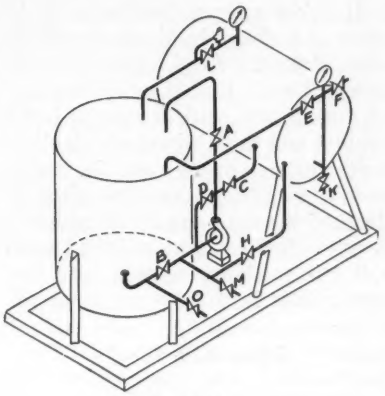
From the main feed lines, the liquid is now run into the filter and the filtrate flows out into the main discharge lines. When slimy suspensions are present, it may be necessary to feed earth continually, to prevent a subsequent breakthrough of any turbid matter or to avoid rapid clogging which might occur if only the initial precoat layer were used. Under these conditions, the filter layers gradually increase in thickness within the filter until the cycle is completed. A 20 to 50 pound end pressure will be created, depending on the amount of materials added and the length of the run. Generally speaking a wide selection of filter materials is available such as: asbestos, diatomaceous earth, activated carbon, wood flour, cellulose fibers, and many other types applicable to specific problems. They may be used alone or in combination.

Clarity and Brilliance

All liquids, even those with the same specific gravity as the turbid matter, are filtered with equal efficiency. A uniformly high degree of clarity and brilliance is obtained in every instance. Asbestos filtering material has an immediate filtering and adsorptive action and a very sharp filtering effect on microscopically fine particles of turbid matter. A crystal-clear filtrate is assured without any long and costly precoat run.



Construction

Pressure Leaf Filters are welded construction throughout, and conform to the highest standards for welded pressure vessels. Due to the

design practically all types of metals can be used, such as steel, stainless steel, bronze, copper, monel and nickel. However, for filtration of wire drawing lubricants, steel construction is the answer, which, happily, is the least expensive of the metals just mentioned. The filter leaves can be of the same materials, and may be covered with metal cloth, cotton duck, wool felt, woven glass, plastics, etc. For your industry, type #304 stainless steel or Monel 80 mesh wire cloth or screening is normally specified. All filter tanks are hydrostatically shop tested before shipping, and, if required, can be constructed in accordance with ASME code requirements.

Cleaning

It takes only a few seconds to open and close the door of a Hercules Pressure Leaf Filter. This is accomplished by an eccentric device combined with a special lever system and hand wheel which eliminate the use of tie rods, tie bolts, and wrenches. After the filter is drained the door can be immediately opened. The light weight leaves roll out easily on a rack, and the spent filter layers are stripped off.

Filter-Aid Feed

Although normally not required in filtration of aluminum wire drawing lubricants, a small pump may be included in the complete Pressure Leaf unit to inject filter-aid automatically, during the run, into the main liquid flow before it enters the filter. In many cases this will materially improve the length of the filter cycle, in particular where slimy suspensions are encountered. Also on occasion, the filter-aid additions will help the eventual cleaning or stripping action of the filter leaves.

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The filter-aid slurry is made up in the precoat tank after the primary precoating materials have been pumped into the filter, and is kept in suspension by means of an agitator. The slurry pump may be set to any specified flow. Therefore the operator can inject a pre-calculated amount of filter-aid.

Pre-Coat Tank

The precoat tank functions as a container for the mixing of the filter material and also for later recirculation while the precoat layers are being formed on the leaves within the filter. This tank is also used as a slurry tank for the continuous addition of filter aids.

Low Pressure Operation

High flow rates at remarkably low pressures are obtained by the Pressure Leaf Filter. After the precoat has been formed on the filter leaves, a starting operation pressure of from 2-3 pounds is normal. The pressure may reach 50 pounds at the end of the filter cycle.

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The method of preparing the system for filtration essentially consists of mixing a slurry of fibrous precoat material and occasionally filter aids and oil in the precoat tank and pumping this through the filter tank where it is deposited upon the leaves to form a mat, the filtering characteristics of which are determined by the blend of the grade of filtering substances used. The grades of fibrous materials used in filtering mineral oils, depending somewhat on the oil viscosity (50—100 SSU, at 100°F), will usually range from a Chrysolite grade #3 (a blend of 30% brilliant asbestos and 70% wood pulp) to a straight asbestos (no wood pulp.) As the percentage of asbestos in the blend is increased there will be a sharper or more brilliant filtering effect.

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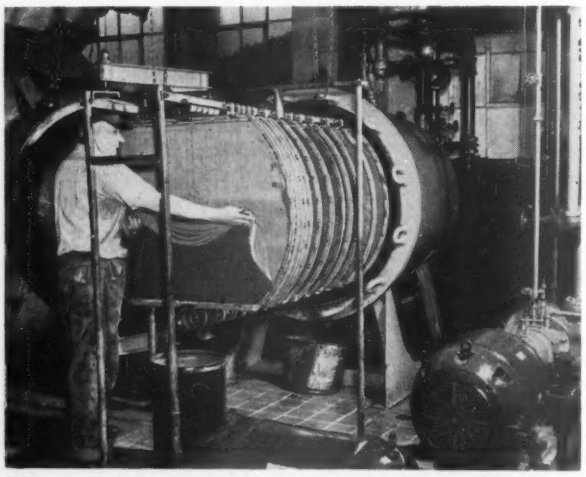
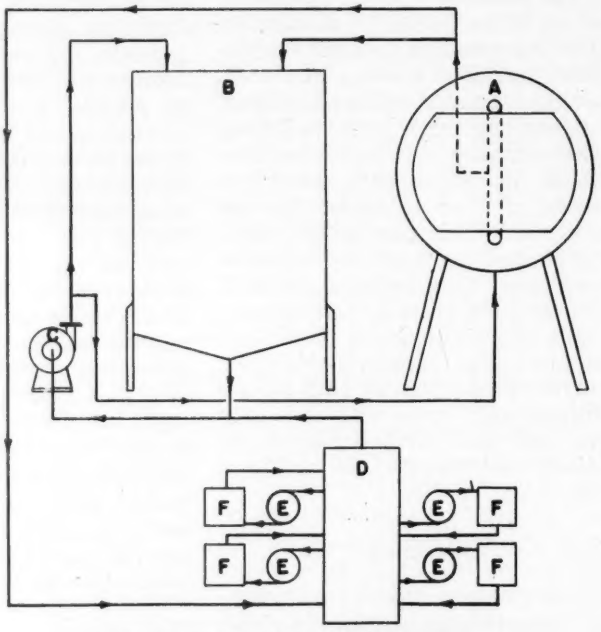
Conversely, however, as might



View of Hercules Model #40 (400 square feet of effective filtering area) Pressure Leaf filter showing cleaning operation (Stripping of spent precoat layers from individual filter leaves) at end of filter cycle.



Line diagram showing typical bypass filtration setup.
A—Filter
B—Precoat tank
C—Filter pump
D—Main oil sump
E—Pumps supplying wire drawing machines
F—Wire drawing machines

Filtration of lubricating and cooling oil in wire drawing and strip rolling.

be expected, there will be a decreased flow rate, possibly a shorter filtering cycle. The trick is always to shoot for the most open grade, that is, let us say, in the Chrysolite #3 or #5 grade range. This is usually permissible immediately in a wire drawing installation if it is possible to start the filter system with a clean oil, or, secondarily, after oil already in use has been rid of its accumulations of suspended matter by means of tighter grades of Chrysolite or even asbestos alone. In short, you work your way down to the most economical operation which boils down to satisfactory clarity over the longest possible filter cycle.

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An important feature of these filter materials, namely asbestos, wood pulp and diatomaceous earth, is the fact that they are inert and have no apparent effect on the mineral oils, occasional additions of lard oil or the additive compounds.

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The cost of filter operation is neglible when it is considered that the normal dosage of Chrysolite precoat is approximately three (3) pounds per 100 sq. ft. of filter area at an average cost of 60c per pound. For example, a Model #12 filter unit, which is a medium size, having an area of 125 sq. ft., will need about four (4) pounds of Chrysolite at a total cost of $2.40. On aluminum wire a continuous filter cycle may be expected to range between 70 and 100 hours. Incidentally, when drawing other types of wire such as stainless steel, nickel, chrome, and other high alloy wires, filter cycles have been known to last as long as one and even two months. If there are any additions of diatomaceous earth the extra cost is slight as this filter aid material is sold between 5 and 10c per pound depending on quantity and grade. On top of this the labor required for cleaning and re-setting is very minor. For a Model #12 this action should be completed within one hour.

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Since one of the main keys to the feature of filtering wire drawing lubricants is "cycle" it is most important that adequate filter area is considered per each wire drawing machine the filter will service. It has been pretty well established that the minimum requirement to be recommended is 30 sq. ft. of filtering area per wire drawing machine. On this basis, therefore, a Hercules Model #12 unit will handle four Vaughn or equal wire drawing machines and assure the longest possible filter cycle. It could handle more but, of course, cycle length would be sacrificed. If filter capacity is insufficient it would gradually become incapable of keeping ahead of the dirt produced in the wire drawing operation. In fact, in order to either bring back or maintain the original light color of the oil, the filter is re-cycled (sump-to-filter-to-sump) over weekends in several plant installations.

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As shown in the typical flow diagram, it will be noted that the filter cycle is completely independent and not connected in any way with the pumping equipment handling the oil to and from the wire drawing machines. This is referred to as a by-pass method of operation and is most important and effective because it eliminates the necessity of shutting down production equipment for servicing the filter.

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Quite specifically it can be stated that the use of mineral oils as lubricants for aluminum wire drawing in conjunction with filtration has resulted in several marked advantages to the Wire Drawing Industry:

(a) Pronounced dollar savings are effected due to the fact the oil does not have to be changed. Only occasional slight additions are needed to replace dragout plus infrequent (every 2-3 months) small quantities of lard oil admitted to give body to the mineral oil and thereby help maintain an even temperature in the range of 120°F. Experience has shown that if the flow of filtered oil is over 10% of the total flow of oil to the wire drawing machines the body of oil is kept absolutely clean. In effect it can be said that the oil will remain in the same condition as when originally installed and this will hold true not for just over a period of months but of several years.

(b) Inevitably, the above established conditions lead us directly to the extremely important factor of increased die life. Actually there is a twofold point to be made here in that not only does the die life increase markedly as against other systems of lubrication—50% and more—but also, by using lubricating mineral oils that are kept filtered clean versus soluble oils, it has been established that wire can be drawn at higher speeds.

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Drawing rates of aluminum wire in the range of 4500—5000 ft./min. has become common practice. Regarding increased die life the records in one plant indicated that with the Hercules filter system the obtention of wire per one finished die was 21000 lbs.; with no filtration it was disclosed that this production figure dropped down to about 6000 pounds per finished die.

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Concerning use of dies there is another important point to mention, namely, that with an assured continuously clean oil it is possible to substitute carbide dies for diamond dies to a certain extent. As an example, it is stated by the operating personnel of one important plant in your industry that when drawing aluminum wire of .064—.013 through their Vaughn machines they use carbide dies in the first eight (8) passes and four (4) diamond dies for the last four passes. On the other hand, when drawing to .010 for assurance of finish, etc., two more diamond dies are added back so that the run is through six (6) passes of each type die. In this particular case it was further stressed by the operators that their ability to use carbide dies successfully was due primarily to efficient filtration. By being able to operate in this manner further dollar savings obviously can be effected.

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In summing up it can be fairly stated that this system is becoming more widely recognized in the wire drawing field as well as the cold rolling field. Repeated in capsule form some of its many advantages are:

1—Ease and economy of operation.

2—Dollar savings such that filter pays for itself within relatively short time, thereby easing the pain of capital outlay invested.

3—Flexibility of filter in that any

(*Please turn to page* 941)

Payoffpak®...

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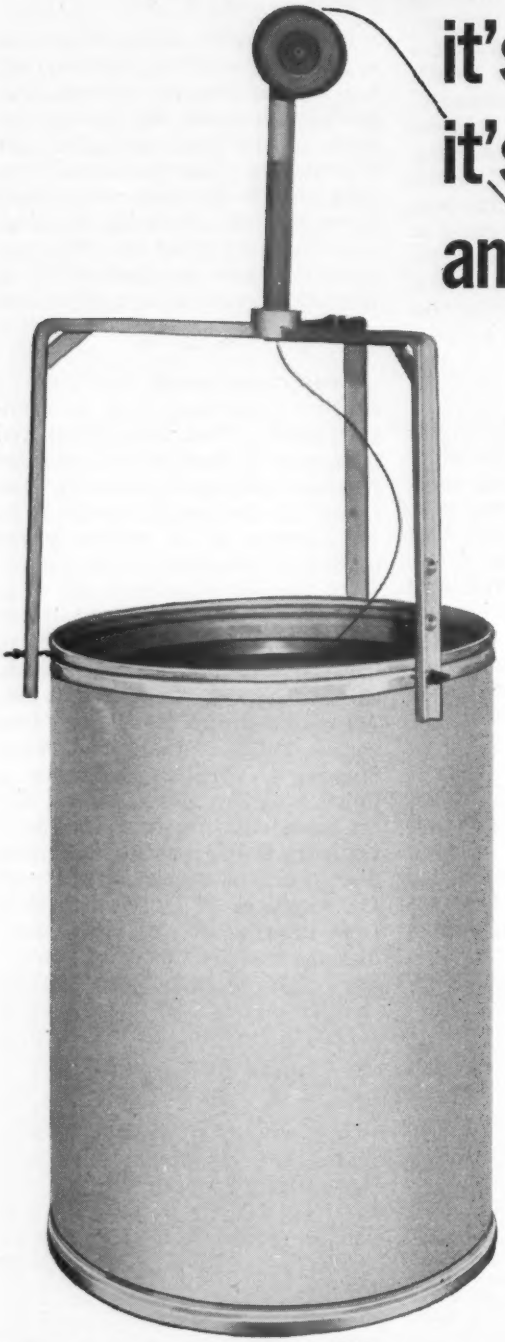

PAYOFFPAK—Continental's newest fibre container—offers wire manufacturers and fabricators a revolutionary new development in wire packaging, handling and dispensing.

SAVES WORK—Wire is automatically packaged in the Payoffpak as it is drawn, eliminating such operations as stripping, tying, handling, splitting and wrapping.

SAVES TIME—Payoffpak can hold 600 lbs. Downtime on the wire drawing machine, due to stripping operations, is greatly reduced.

ELIMINATES REELS—Single standard-size Payoffpak eliminates reels and need for wide range of block sizes.

CUTS SHIPPING COSTS—Inexpensive, light-weight Payoffpaks travel for less because of extremely light tare weight.

HANDLES AND STACKS EASILY—In-plant handling of Payoffpaks is easy with conventional hand trucks. High stacking strength means you can use maximum storage space, too.

A survey indicates that often more than 50 labor steps are needed to convert 500 pounds of steel wire in standard eight inch coils—but you can do the same job with Payoffpaks in an average of five operations. No wonder they are calling this new container "the long-playing record of the wire industry" See how Payoffpaks can pay off for you. Call Continental for complete information on this exciting new way to package, handle and dispense wire.

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Inorganic Fibrous Insulations

by E. Q. Harrigan, Sales Manager
Continental Wire Sales Corporation
Wallingford, Connecticut

A paper delivered before the New York Regional Meeting of The Wire Association held on April 28-29, 1955 in New York City. Due to his illness at the time of the meeting, Mr. Harrigan's paper was presented by Frank J. Clark, Plant Manager of Continental Wire Corporation's Wallingford Plant.

If the question is asked, "What is new in inorganic fiber for wire insulation," the answer may be "very little." However, just as the revival of an ancient joke may make it seem new, we hope that some of the ancient history concerning asbestos and glass fibers as used in the wire industry, may today seem new.

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The original and basic electrical insulating material for high temperature application is asbestos. It is a mineral which is mined extensively throughout the world but found in greatest concentration in Canada and Rhodesia, South Africa. The asbestos used in electrical insulation is commonly referred to as chrysolite. In order to bring asbestos to the stage where it can be used on insulating machines, an elaborate process takes place. From the mining operation the ore proceeds through a number of crushing and screening operations. Out of twenty tons of ore, less than one ton of crude is recovered which forms the basic raw material for electrical insulating grades of asbestos. This crude is further processed through crushing and fiberizing and air separation to produce fibers suitable for specific end products. Asbestos fibers when split to their finest components are so slender that one million laid side by side will cover only one inch. This compares with the average of 630 human hairs to cover one inch. In wire insulation several different grades of asbestos textiles are used. A scale of minimum asbestos content ranges from commercial grade of 75 per cent up to a grade known as AAAA which contains 99 per cent asbestos. The finished products take the forms of lap for carding, roving and tape for wrapping, and yarn for braiding. These may be further classified as ferrous asbestos or non-ferrous asbestos. The ferrous grade may contain as high as 6 per cent magnetic iron and the non-ferrous grade not more than 1.75 per cent.

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Glass as used for wire insulation is a newer development as compared to asbestos. It is produced by drawing fibers from a crucible of molten glass. Whereas the asbestos fibers are hygroscopic by nature and, therefore, absorb moisture readily, glass fibers do not absorb.

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A pure silica fiber has been produced by leaching glass fibers. The resultant product is available as yarn for serving or braiding. It lacks the tensile strength inherent in the regular glass yarn, but it will withstand temperatures up to 1,000°C. Of course, there is no compound or finishing material which may be used at such a high temperature and, therefore, the silica fiber yarn is suitable only where resistance to heat is of primary importance, and there is no need for resistance to either abrasion or moisture. The wire industry is producing wires and cables rated in the National Electrical Code at temperatures up to 200°C. Asbestos will withstand a top continuous temperature of 400°C which may be exceeded by quite a wide margin for intermittent use. Glass is rated at a top continuous temperature of 500°C.

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There has been an ever present problem for development of impregnants and finishes which would enable us to take advantage of the high temperature ratings of both asbestos and glass. Such materials in addition to heat resistance would necessarily need good dielectric as well as abrasion and moisture resistant characteristics. For temperature classifications up to 150°C, the usual impregnant for asbestos where moisture resistance is involved is a hydro carbon/compound. Since glass needs no added moisture resistance, it is generally treated with lacquer or varnish type materials which coat and fill the interstices and thereby impart added dielectric and abrasion resistance.

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For 200°C continuous temperature rating, silicone varnishes are used for impregnating and finishing of asbestos and treatment of glass. Insulation of this type has good resistance to both moisture and abrasion. In this same classification, Teflon tapes have been used in combination with asbestos and glass to produce a wire with a higher voltage rating.

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There are many applications for insulated wire where the temperature will be above 200°C. An example of this would be the requirement for a lead to electric heating elements. Copper normally is limited to a top continuous temperature of 200°C. Oxidation and embrittlement occurs when this metal is used more than intermittently above that temperature. Therefore, to go to the higher temperatures where asbestos and glass insulations perform in a satisfactory manner, we turn to nickel and nickel clad copper conductors.

(*Please turn to page* 942)

The West Coast Regional Meeting of The Wire Association

Another highly successful Regional Meeting of The Wire Association has become history.

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This year the annual West Coast event was held at the Palace Hotel in San Francisco, California, on June 10th.

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Approximately 100 registered at the hotel in the morning, following which they were transported to the wire and wire rope plant of the E. H. Edwards Company at South San Francisco, where they were joined by some 40 additional persons.

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The first event was an Open Forum session, set up for wire mill men and wire users. Five men served on the panel to lead the discussions and answer questions from the floor. These gentlemen were:

Panel Chairman: J. W. Egan, Manager of Wire and Wire Products Sales, Bethlehem Pacific Coast Steel Corp., San Francisco

Elmer E. Bonds, Mill Supt., K. H. Davis Wire and Cable Corp., Los Angeles

E. Jefferson Crum, Technical Consultant, R. H. Miller Co., Homer, N. Y.

William Mohr, Wire Mill Supt., Pacific Coast Division, The Colorado Fuel & Iron Corp., South San Fancisco

Sterling Edwards, President, E. H. Edwards Wire Rope Co., South San Francisco

D. F. Thompson, Central Division Manager of Sales, Fibre Drum Division, Continental Can Co., Van Wert, Ohio

The session opened with short talks as follows by panel members:

Fine Wire by Mr. Elmer Bonds, Mill Supt., K. H. Davis Wire and Cable Corp., Los Angeles

Development of the Pay-Off-Pak System by D. H. Thompson, Central Division Manager of Sales, Fibre Drum Division, Continental Can Co., Van Wert, Ohio.

Cold Heading Lubricants by E. Jefferson Crum, Technical Consultant R. H. Miller Co., Homer, N. Y.

Equipment of the E. H. Edwards Company by Sterling Edwards, President, E. H. Edwards Wire Rope Co., South San Francisco

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Mr. Edwards' talk was extemporaneous and is not printed, but the others will be found elsewhere in this issue of Wire and Wire Products.

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After a refreshing luncheon, served to their guests by the E. H. Edwards Company, manufacturers of Edwards Wire and Edwards Wire Rope, of which Sterling Edwards is the president, the visitors were escorted through the plant. Assisting Mr. Edwards in acting as hosts to the visitors were Russell T. Hendrich, Vice President in Charge of Sales; Edward B. Stookey, Works Manager; Herbert Rothwell, Plant Superintendent; and Kermit Williams, Executive Vice President and Treasurer.

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The guided tour revealed a smoothly operating production system composed of ten primary processes, described in a separate article in this issue.

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The party returned to the Palace Hotel in the late afternoon and recongregated at 6 P.M. for the cocktail hour as the guests of Wire Specialties Company of California, Santa Clara; John A. Roebling's Sons Corporation, San Francisco; Planett Manufacturing Company, Oakland; Bethlehem Pacific Coast Steel Corporation, San Francisco; The Colorado Fuel & Iron Corporation, Oakland; Continental Can Company, San Francisco; and Columbia-Geneva Steel Division, United States Steel Corporation, San Francisco. The R. H. Miller Company, Homer, N. Y., furnished the music and entertainment for this delightful affair.

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At 7:00 P.M., with 155 persons on hand, the members and their guests repaired to the banquet hall for dinner, which, true to Western tradition, could have been accorded a blue ribbon for excellence.

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When these festivities were concluded, Frank H. Beckman addressed the group on the subject of "Selling Yourself." His talk was interesting, entertaining and worth-while.

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This was followed by the showing of a sound-color motion picture entitled "Steel Builds the West," shown through the courtesy of the Bethlehem Pacific Coast Steel Corporation. It portrayed some consumer uses of steel—oil industry, railroads, agriculture and so forth. The Association is grateful for the opportunity afforded by Bethlehem to our members to view this fine picture.

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The final event of the evening was the distribution of door prizes, which were donated through the generous forethought of the following companies:

Angier Pacific Co.—Yellow Cat Script Book

Morgan Construction Co.—Desk Set

Colgate-Palmolive-Peet Co.—Soap

Oakite Products, Inc.—Carton of Oakite

Poor & Co., Promat Div.—Tea Table

Industrial Compounds Co.—Two Electric Coffee Makers

Braun-Kenecht-Heineman — Barometer

Archer-Daniels Co.—$10.00 and Automatic Pencil

Standard Industrial Compounds Co.—Candy Dishes

General Chemical Div., Allied Chemical and Dye Corp.—Box of Golf Balls

Firth Sterling, Inc.—Two Carving Sets

American Chemical Paint Co.—Cutlery Set

Stauffer Chemical Co.—Two Bottles of Whiskey

Vaughn Machinery Co.—Camera

Vascoloy-Ramet Corp.—Fishing Pole

Lee Wilson Engineering Co.—Two Fishing Kits

Parkin Chemical Co.—Spinning Reel

(*Please turn to page* 943)

Open Forum Discussion between Wire Mill Men and Wire Product Fabricators

Panel Chairman
J. W. Egan, Manager of Wire and Wire Product Sales,
Bethlehem Pacific Coast Steel Corporation
San Francisco, California

Fine Wire

by Elmer E. Bonds, Superintendent
K. H. Davis Wire and Cable Corporation
Los Angeles, California

The purpose of the short talks this morning is to try to acquaint the users of wire and wire products with the methods of manufacture as well as the different types and finishes of wire.

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Wire is designated by the size and shape of its cross section, such as coarse round, fine round, and shapes. Of these, I have chosen Fine Round in the C1008 and C1010 Grades as the subject of my talk.

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Fine Wire in most plants ranges from 20 Gauge to 40 Gauge and finer. There is a range from 16 to 20 Gauge in which the distinction is not clearly drawn. Sixteen Gauge may be classed as Fine Wire in some manufacturing processes, while in others it is classed as Coarse Wire. Because of the variety of uses, it is impractical to set exact descriptions for each application.

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By drawing wet, special finishes can be attained. These finishes depend on the preparatory heat treatment and coating prior to the drawing operation and, except for a few cases, the end use controls the processing within the Wire Mill.

Fine Wire is usually drawn in 8″ coils and unless otherwise specified, this practice is generally followed. Although the practice is usually coils, a great many plants draw the wire on spools for their integrated operations as well as for customer requirements.

★ ★ ★

Fine Wire is drawn on what is called a "Wet Machine." By Wet Machine we mean a cone-type or ring-block type with the wire drawing through or from a liquid lubricating solution, with finishing speeds up to 5,000 feet per minute. Wet Drawing, a few years ago, was done on single hole blocks. The coil of wire being drawn was drawn out of a vat of rye meal liquor which acted as a lubricant. This liquor was made by steaming rye meal and water for a few hours then leaving it stand and ferment for several days. Believe me, Fellows, the odor far surpasses the odor from the local stockyards on a rainy afternoon.

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In our plant in Los Angeles, we draw considerable amounts of 26 Gauge for uses in various manufacturing processes. This we draw from 16 Gauge Annealed to around 45,000 P.S.I. This is drawn 13 holes and about 90% reduction in area with an ultimate tensile of approximately 145,000.

★ ★ ★

We have found that C1010 Basic Wire increases about 10,000 P.S.I. for each gauge that is drawn. We speak of tensile because the Tensile Test to the Wire Mill man is the most informative test that can be applied to wire. It is reliable and has the decided advantage of being accurately duplicated.

★ ★ ★

Fine Wire is manufactured in three common types: Hard, Soft, and Annealed. Hard, Hard Drawn, as it is sometimes called, is drawn from an annealed stock, usually 70% reduced in area or even farther to its final wire size without any additional heat treatment to alter its mechanical properties. It is used in manufacturing processes where a Hard Low Carbon Wire is

This panel discussion was held during the West Coast Regional Meeting of The Wire Association on June 10th, 1955, at San Francisco. Besides Mr. Egan, the panel consisted of Elmer E. Bonds, K. H. Davis Wire and Cable Corp.; E. Jefferson Crum, R. H. Miller Co.; William Mohr, Colorado Fuel and Iron Corp.; Sterling Edwards, E. H. Edwards Wire Rope Co.; and D. H. Thompson, Continental Can Co. Opening talks presented by Messrs. Bonds, Edwards, Thompson and Crum, are given. An active discussion period followed the talks.

necessary and where slightly uneven temper is not of importance. One of the largest uses for Fine Hard Basic Wire is in the weaving of screen cloth and other common uses are: Low Carbon Brush Wire, Paper Clip Wire, Staple Wire, Spiral Binding Wire, and Hair Pin Wire, Common Grade. With the improvements that have been made on machines making spiral fireplace curtains, a few companies are able to use Hard Drawn Wire, which gives a stronger curtain as well as a cheaper price on their raw material.

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Soft Wire is produced for applications where the Hard Type would be too hard or too stiff, or where controlled mechanical properties are required for specific application. The applications of Brite Soft Wire vary from staples and wire cloth to the fancy rickrack around your favorite ash tray or knick-knack shelf.

★ ★ ★

Annealed Wire is wire that has been heated to relieve the hardening effects of cold drawing. The finished wire is heated up to a point near 1333° F. A Low Carbon wire with a full anneal has a tensile of 45,000 to 50,000 P.S.I. and is used in the florist trade for the assembling of floral pieces and designs, stone wire, and any application where a soft pliable wire is desired.

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Finishes on wire are generally termed Drawn Finish and Coated Finish. Drawn Finishes are applied prior or during drawing. Coated Finishes are applied at finish size. The most common of Drawn Finishes are Brite, Coppered, Liquor Finish. The most common Coated Finishes are Galvanized, Hot Dip Electro-Galvanized, Drawn After Galvanizing, Tinned, and Cadmium Plated.

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First, the Common Brite Finish or Lime Brite Finish is wire drawn without any special coating. It is usually coated with lime or lime substitute prior to drawing, which gives it a dull grayish finish.

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Second, Copper Finish Wire has a very thin coating of copper. It is drawn from wire that has been coated in a solution of Copper Sulphate. After coating, the wire is drawn to final size with special lubrication to produce a bright, clean coppered finish.

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Third, Liquor Finish wire is produced in the same manner as the Copper Finish with this exception: to the Copper Sulphate solution is added a given amount of flaked pure tin or Stannous Sulphate. We use Stannous Sulphate in our operation because it goes into solution as soon as it is added. With Flaked Tin there is a waiting period for it to dissolve into solution. The color of Liquor Finish Wire can be controlled from a straw color to a silver white finish by the amount of tin or Stannous Sulphate that is added to the Copper Sulphate solution.

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A Galvanized finish may be produced by two different methods: the Hot Dip and the Electro-Galvanize. The Hot Dip is produced by passing strands of wire through a pot of molten zinc. The wire is wiped and quenched as it emerges from the molten metal. The wire is generally annealed in the same operation by passing through molten lead followed by a cleaning operation preceding galvanizing.

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Electro-Galvanizing may be processed in the same manner as the Hot Dip methods with the exception of the coating application. The wire being coated is passed through electrolytic cells containing a solution of zinc salts, whereby the zinc is electro-deposited on the wire. Using the electro process, it is very easy to vary the amount of zinc deposited.

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Galvanized wire is used where a corrosion resistant material is required. Galvanized Wire may be drawn after galvanizing to increase its tensile strength and is used where a High Tensile Low Carbon Galvanized Wire is desired, such as Sash Cord, Tag Wire, Spiral Binding Wire.

(*Please turn to page* 944)

Panel members for Open Forum, left to right: Elmer E. Bonds, Mill Supt., K. H. Davis Wire & Cable Corp., Los Angeles; E. Jefferson Crum, Technical Consultant, R. H. Miller Co., Homer, N. Y.; William Mohr, Wire Mill Supt., Pacific Coast Div., Colorado Fuel and Iron Corp., So. San Francisco; J. W. Egan (Chairman), Mgr. of Wire and Wire Product Sales, Bethlehem Pacific Coast Steel Corp., San Francisco; Sterling Edwards, President, E. H. Edwards Wire Rope Co., So. San Francisco; and D. H. Thompson, Mgr., Central Division Sales, Continental Can Co., Van Wert, Ohio.

Cold Heading Lubricants

by E. Jefferson Crum, Technical Consultant
R. H. Miller Company, Inc.
Homer, New York

It is always a pleasure to attend the West Coast Meeting of The Wire Association. I appreciate the opportunity given to me by Mr. Egan for passing along some information on cold heading lubricants.

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Cold heading wire is an extremely broad classification. This is especially true nowadays with the modern cold header usurping the field of the screw machine. Depending upon the severity of the cold working, the closeness of tolerances, final finish required and the shape of the part, the wire finish required varies all the way from an extra-clean, extra-bright wire to an extremely heavy double extrusion coating.

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Because of the limited time available this morning and because the majority of interest is, I believe in the wire finish, such as is required in the making of machine screws and bolts, I shall stick to cold extrusion lubricants.

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Extrusion wire finish is likewise a very broad classification, depending upon the severity of extrusion, the sharpness of the corners, whether open or closed dies are used, the composition of the metal involved and the type and speed of the heading machine.

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Although there are some exceptions, generally speaking the rod or wire is lime-coated for drawing. In recent years many have concentrated on improving their liming practice and have reaped rewards by doing so. It is pretty generally agreed that it is better to apply the lime coating in several dips in light or medium lime rather than to attempt to put on the coating in one dip of heavy concentrated lime. Further improvements have been made by recirculating the lime suspensions, by continuously skimming the foam from the surface of the bath, by setting up standards and maximums for grit content of the lime and by improving slaking and addition techniques to improve the suspension of lime.

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To fulfill the most difficult requirements of the heading operation new lubricants have been developed. Where high tensile metals are given a long, difficult extrusion and at high speeds in closed dies, it is necessary to develop a finish on the wire to withstand this severe treatment. Generally, these lubricants have metal soaps as their base. Aluminum and calcium soaps are particularly favored.

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One of the most successful of the recent developments has come about through an improved technique for making the lubricant. The old practice of mechanically mixing light density aluminum soaps with heavier filler powders produced a mixture which was almost impossible to maintain. During shipment and during vibration in the die box there was a separation of the components.

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With the new technique of manufacture almost all of the filler is put into solid solution during the manufacture of the metallic soap. This results in a very homogeneous powder which produces a uniform gray glossy finish so desired by the heading people. The density of this powder is such that the resulting mixture with excess lime coming from the rod or wire entering the die box will not separate. As a matter of fact, we usually recommend a relatively rich powder, which, when diluted by this excess lime, will be of the proper richness.

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Lately, a great deal of emphasis has been put on the anti-weld component of the cold extrusion lubricant. Holding the grit content down to a minimum is of utmost importance. There are many compounds that will fulfill this function, but some are certainly better than others.

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Again, I appreciate the honor of being with you. Thank you very much.

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Payoffpackaging

by D. S. Thompson
Central Division Manager of Sales
Fibre Drum Division
Continental Can Company
Van Wert, Ohio

This talk on the development of The Pay-Off-Pak method of packaging, shipping and serving wire was delivered by the author at the Open Forum Session of the West Coast Regional Meeting of The Wire Association on June 10, 1955, in San Francisco.

Something over two years ago, **Continental Can Company** acquired the rights to the "Payoffpak" method of wire packaging, and undertook to introduce and promote it within the wire industry. Our purpose, of course, was to exploit what appears to be an interesting market for our Leverpak fibre drums, the Payoffpak being an adaptation of that well proven container.

★ ★ ★

In that two years, the basic method has been made known to nearly every segment of the wire industry. The techniques, the know-how, the ways the method can profitably be put to work in a wire mill, the advantages to wire producer and wire user alike—these things have been widely and fully discussed by men better qualified than I to do so. Advertisements by Continental Can Company and by **Coulter-MacKenzie Machine Co.**; articles in "Wire & Wire Products;" a paper presented at the Annual Convention of **The Wire Association** last November by **W. H. Richardson** of **The Driscoll Wire Co.**, who developed the system; all these and countless personal interviews and conferences have carried the technical story to your industry. So I'll not attempt to present a talk on the method, or discuss the problems involved with particular kinds of wire. Rather, I think I can best use my time and yours by giving you a brief, nontechnical "progress report," and indicating to you by just a few examples how far this idea has gone—in all directions—from the limited field in which it was originally proved out.

★ ★ ★

Remember, the Payoffpak was not just a promotional gimmick dreamed up by Continental's Sales Department. A **wire man** developed it. He did so to give himself a competitive advantage in selling his wire. It happens that he specializes in low carbon fine and specialty wire, and when we came into the picture that and brass pin wire were the only kinds that had ever been packaged by the Payoffpak method. But we reasoned that if it was profitable for him and his customers, it should be equally profitable for all the rest of you—and your customers.

★ ★ ★

So we started out, full of confidence and ignorance, to spread the gospel. Everywhere we were courteously received. Everyone was interested to hear the details of a new, intriguing method of wire processing and packaging. The advantages were readily apparent—from the point of view of the customer, at any rate. We called on every wire producer we could find, and everywhere encountered the same courteous interest. But there it seemed to stall dead center. The common reaction was: "It looks very interesting, and practical, too—for a maker of low carbon fine wire. But my wire is different, and it won't work." Then would follow the list of automatic objections. The problem of twist; the problem of drawing speeds; the problem of wire size; of hardness or softness; of inspection; of final annealing; etc. etc. We were not qualified to make positive statements on any of these problems as they might relate to a particular kind or specification of wire. And we couldn't hire an expert on the subject because there were no experts. The problems needed solving, and the questions needed answering by trial and experiment in wire mills, and the industry—by and large—did not seem particularly interested in spending the necessary time and money.

★ ★ ★

This attitude, while frustrating to a hungry drum salesman, was perfectly understandable and reasonable. Most mills were—and are—selling all the wire they could produce. Why complicate the situation and use valuable engineering time on an untried method, when there was no customer demand, no certainty that it would work anyway, and when selling more wire would just put the plant farther in the hole on deliveries?

★ ★ ★

But users of wire—all kinds—began to prick up their ears. The manifest advantages to them of r e c e i v i n g wire in Payoffpaks brought a flood of requests for information and trial shipments, and it became apparent that the mills ought to know what could or could not be done with their product in Payoffpaks. Fortunately, at this stage, it became possible to ask for and get competent technical help. The Coulter-MacKenzie Machine Company of Bridgeport, Conn., which had been commissioned to build the first machine for loading Payoffpaks, correctly diagnosed the potential value of the system to the industry and its customers, and proceeded to design and build a series of excellent machines which today are in wire mills all over the country. This able and energetic company worked closely with all those who wanted the answers in terms of their own products, and in so doing found out that many of the objections, barriers

and bogey-men disappeared as real engineering effort and growing experience were applied.

★ ★ ★

Here are just a few of the developments which have come to light in recent months. They show what happens when practical wire men really apply themselves to a problem of this type, seeking to make a good idea work for their own products, and forgetting that it hasn't been done before.

★ ★ ★

In discussing the types of wire to which the Payoffpak system might be applied, we were very early convinced that **one** kind, at least, was completely hopeless. We were told: "Save your time and stay away from soft copper—particularly magnet wire." Magnet wire was too soft—wouldn't take a cast. The coatings were too delicate and fragile—couldn't possibly be shipped in a drum. **Nobody** would want 500# or even 100# in a continuous l e n g|t h. Besides, it would tie itself in bow knots when paid out of a drum. The only conceivable way to handle it was on spools, painstakingly and accurately traversed, with all the elaborate drives and brakes and tensioning devices that had been developed over years of experience. Customers' plants were designed and set-up to handle spools, and they wouldn't consider changing, etc. etc.

★ ★ ★

We were convinced. But just because we live only 25 miles from a center of magnet wire manufacture, we talked to several producers, who were intrigued with a novel idea but who unanimously confirmed what we already knew—it wouldn't work! One of them however, pondering the tremendous possibilities if only it **would** work, decided to find out. Some months later an advertisement by **Rea Magnet Wire Co.** in the Wall Street Journal announced the introduction to the trade of 500# of magnet wire in Reapak fibre drums. The reaction was instantaneous and favorable. Other producers have likewise introduced the package, and a genuine little revolution is well under way in this segment of your industry. Why do users go for the package? Without listing all the many technical and operating reasons, it adds up to this—it **makes money** for them.

★ ★ ★

And here's a "plus" that no one counted on. When spooled under tension there is inevitably some work—hardening of magnet wire. Ideal magnet wire is dead soft. Pouring into drums reduces the amount of work-hardening and quality goes up.

★ ★ ★

At the other end of the scale, both in size and hardness, we have brass screw machine stock. A large New England user, conscious of quality and cleanliness, read about Payoffpaks and asked his supplier about them. Of course it wouldn't work; too thick—too stiff. But the producer decided to find out, and he found out that it **did** work. Now other brass wire is being packaged and marketed in diameters from .018 to .250.

★ ★ ★

Here's another. We were given a dozen reasons, all the sincere opinions of experienced men, why the Payoffpak system is **not** applicable to welding wire. Some of the first tries were disappointing. But today, in Kansas City, the American Welding Society Allied Industrial Exposition is being held. And as the culmination of some months of development work, the **Air Reduction Co.** is displaying in its booth, for the first time, welding wire for sale in Payoffpaks. This is too new to try to evaluate for the future. But it is another "impossible" which today is an accomplished fact.

★ ★ ★

Another field which looked from the start to be a natural, from the consumer's point of view, was high carbon spring wire for mattresses, furniture, bed springs, auto seats, etc. But for a long time there was an enthusiastic disinterest displayed toward supplying it. Technical problems again, and lack of equipment. But the problems appear solved today, at least in the range of gauges 13 to 19, and there appears to be no real barrier to working with both heavier and lighter sizes. Only sixty days ago, we were asked by a sales representative of an Eastern mill to call with him on a large buyer of spring wire. We did so, and talked about Payoffpaks and what we felt they might do for him as a production tool. He asked for a few trial drums, saying that if half our story were true he could make money by buying his wire in Payoffpaks. A date was set for the trial, and we were on hand. But he hadn't been able to wait, and had already demonstrated to himself the previous day that the idea was not only workable but beautifully adapted to his type of operation. We were very glad to stand and watch his machine turn out a steady stream of cross-helical springs from #16 wire, while listening to him and his foreman tell **us** all the ways he could save money with Payoffpak-aged wire.

★ ★ ★

No one claims that the Payoffpak system is a panacea for every problem. Certainly there must be types of wire which cannot be so packaged. Certainly there are wire users whose operations are such that they cannot exploit the advantages. But you should know that the last six months have clearly demonstrated that the system is applicable to many types, sizes and specifications of wire not contemplated or thought possible in the original development. No enormous tonnages have yet been shipped because there is not yet enough equipment in existence to turn it out. But wire users are coming alive to its very genuine money-making possibilities,, and a real consumer demand is developing. Producers who have really studied the system in relation to their own operations are likewise becoming aware that in their own mills there are cost savings which are, to say the least, interesting.

★ ★ ★

So my message to you is simply this: The Payoffpak is not essentially the baby of Continental Can Company. Of course we're spreading the gospel as best we can, because we want to sell Payoffpak

(*Please turn to page* 944)

E. H. Edwards Company Hosts to The Wire Association

Kermit Williams, Executive Vice-President and Treasurer.

Members of the Wire Association, meeting in San Francisco during June for a Pacific Coast Regional Conference, were guests of the E. H. Edwards Co. at the company's headquarters in South San Francisco.

Following a morning business session, approximately one hundred and thirty conferees attended a luncheon at the Edwards plant, then toured the various operations involved in the production of wire and wire products, principally wire rope.

Concentrated on wire rope manufacturing, the guided tour revealed a smoothly operating production system composed of ten primary processes: heat-treating, cleaning, preliminary wire drawing, reheating (patenting), recleaning, cold drawing, testing, galvanizing, stranding, and closing. In addition, the group saw how Edwards wire is carefully tagged and stored after testing.

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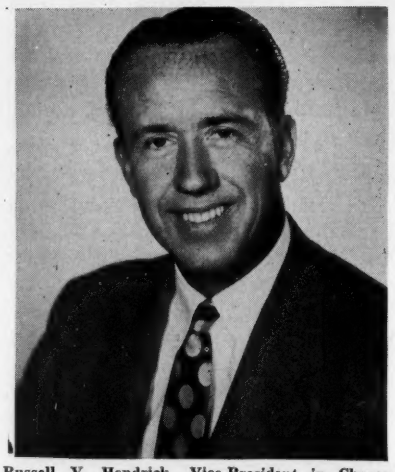
In the heat-treating department, rods of the correct steel composition are heat-treated by pulling them through a long furnace at a specified speed and temperature. This preliminary heat treatment makes the internal grain structure



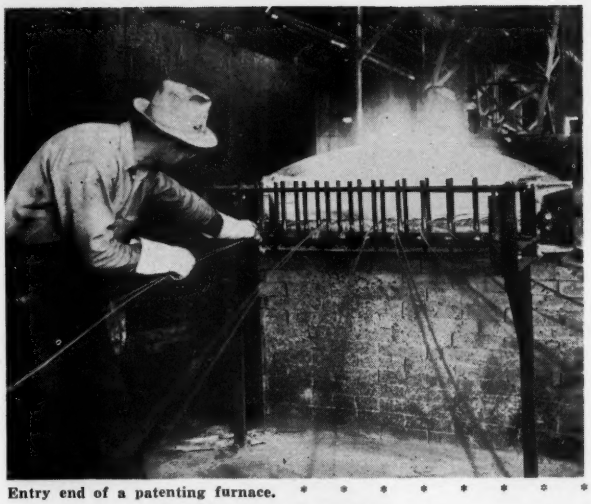
Russell V. Hendrick, Vice-President in Charge of Sales.

of the steel more uniform throughout the entire length of all the rods.

★ ★ ★

After the first heat treatment, the rods are cleaned. They are first dipped in a bath of hot, dilute sulphuric acid until all rust and/or

Sterling Edwards (left), President of the E. H. Edwards Co. and Cynthia Williams, Secretary.



Entry end of a patenting furnace.

Rudy Steinbruck (right) explains operation of continuous wire drawing bench to (left to right): C. R. Mehl of Industrial Compounds, Los Angeles; R. V. Durrazo, Balfour, Guthrie & Co., San Francisco; Richard S. Carlin, Balfour, Guthrie & Co., Los Angeles; A. A. Olson, Bethlehem Pacific Coast Steel Corp., Los Angeles; and Alex Simms, Colorado Fuel & Iron, Oakland.

scale is removed. Concentration and temperature of the acid are constantly checked and the duration of the bath is carefully timed to get down to the bright steel. The rods are then rinsed by pressure water jets and dipped into a hot neutralizing and coating bath. This stops the chemical action that has been taking place. When the rods are thoroughly coated, they are placed in a modern baker where any remaining acid, plus all moisture, is baked out.

★ ★ ★

Cold drawing to successively smaller sizes is one of the steps that makes wire the really tough material that it is. The rods are placed on "swifts" so that they will reel off easily and then the ends are mechanically pointed so that they can be started through a die. They are then pulled through a die and wound on pulling blocks. This process gets the steel down to size and makes it absolutely round. The internal structure of the steel is changed and it becomes tougher and more fibrous as it works through the tapered die.

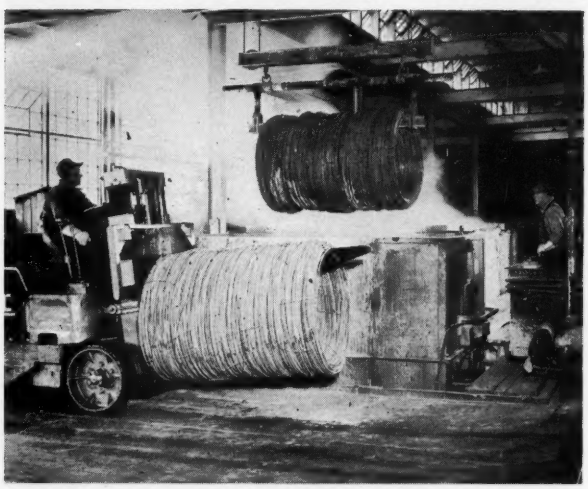
★ ★ ★

The preliminary wire drawing has reduced the diameter of the rod to a specified size and has produced the desired internal structure. Then the wire is sent again through the heat treating (or patenting) furnace. This process affects the internal structure of the steel so that the known amount of later drawing will give it the desired final qualities.

When the wire leaves the furnace, the coils are sent through a re-cleaning process of acid, rinse, neutralize, and bake. During baking the heat is accurately controlled and the uniformity of the heat, with the type of circulation used, insures positive drying for the entire coil.

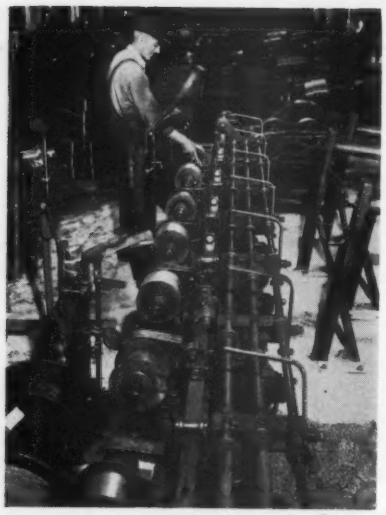
★ ★ ★

At this stage, the preliminary wire drawing has made the wire absolutely round and brought it down to the proper size for finishing. The re-heating, or patenting, has fixed the internal structure of the steel so that the known amount of later working will give it the exact combination of qualities



After cleaning and baking, coated rods are delivered to the wire drawing benches by ram-truck.

Each coil of finished wire is carefully tested for strength, toughness, and accuracy of size and cross section.



Ahead of wire rope production, coils of wire are carefully and uniformly spooled onto bobbins.

needed for the final end-use. Next, the rods move back through the wire mill for further drawing. This complete cycle of heating, cleaning, and drawing may be repeated several times before the wire has the exact required size and qualities. Again, it is pulled through smaller and smaller dies, each trip reducing the diameter, lengthening the wire, and the "cold working" toughening the steel.

★ ★ ★

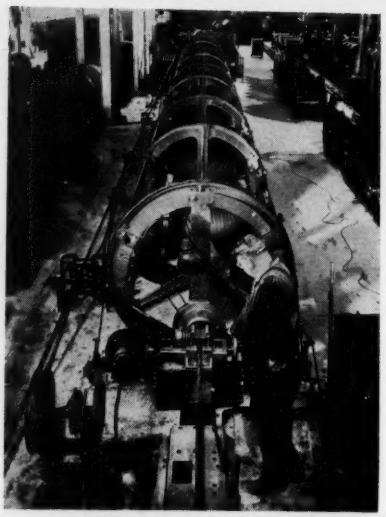
In certain installations, the operating conditions call for a protective coating of zinc which acts as a rust preventative. When this galvanized wire is required, exactly the same steps described previously are taken. Rods of predetermined qualities are selected, patented, cleaned, and drawn the required number of times to finish the wire to the desired strength and size allowing for the zinc coating that will be added. Then an additional step is taken. The wire is again cleaned, this time with a muriatic acid solution, carefully dried with controlled heat, and then passed through pure molten zinc which bonds itself to the bright, clean steel. Both "single" and "double galvanized" wire are produced at the Edwards plant.

★ ★ ★

Every coil of wire that is drawn in the Edwards plant is sent to the testing department for three specific tests—tensile strength, torsional toughness, and true diameter. Pieces of wire are cut from each coil and subjected to these tests. Each grade of steel has specified minimum standards which the wire must meet. After testing, the wire is stored for use in the manufacture of wire rope.

Wire Rope Production

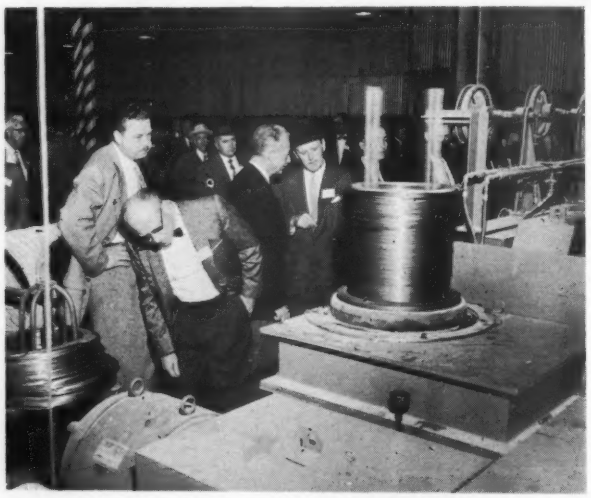
All of the wires that have the same purpose within a rope (outer wires or a special group of inner wires or filler wires or heart wires) must have the same qualities throughout. Therefore, each group of wires comes from rods of exactly the same composition and has been heat treated and drawn as a unit so that the wires are exact duplicates. Coils of tested wire are spooled evenly and carefully on equipment specially designed for this purpose. Endless wire is then made by an ingenious machine that electrically welds the ends together and then anneals the weld so that there is no brittle spot. This is one of the key steps in the production of wire rope.



The strand itself is spooled onto bobbins and mounted in the closing machine for the final step in rope making known as "closing," shown here.

★ ★ ★

Next the endless wire moves to the stranders. Stranding is the process of laying wires in a precise pattern around a heart wire. The direction in which the wires coil, either right or left, and the degree of pitch or "lay" that they are given are controlled to meet the specific requirements of the finished rope. Wire-filled bobbins are placed in cradles in the strander and the wires are brought forward



Sterling Edwards, president of the company, described the operations of one of three newly-installed wire drawing benches. * * * *

Guests inspect Edwards' famous "Weldweave" machine, used in the manufacture of stucco netting, another Edwards product. * * * *

Wire Association group enjoys luncheon in Edwards' plant. Fish-netting, an Edwards product, is shown in the background.

along the outside rim of the machine to the head where they are gathered and converge through a die in the desired pattern. The machine rotates and, as the wires are pulled through, one or more layers are precisely coiled around the heart wire to form the strand.

★ ★ ★

From the stranding operation, strands move to the closing department. Closing is a process, similar to stranding, of laying the strands in an exact and constant pattern around the center or core. The direction which the strands take and the "lay" or amount of pitch they are given are controlled to meet the specific requirements of the rope being made. The strand is cut into the necessary parts and spooled on bobbins that are then cradled in the closer. The strand is led forward through the head and converges around the core as it passes through the precision closing die.

★ ★ ★

Hosts for the Wire Association luncheon and plant tour were Sterling Edwards, president of the company, Kermit Williams, executive vice president and treasurer, and Russell Hendrick, vice president in charge of sales.

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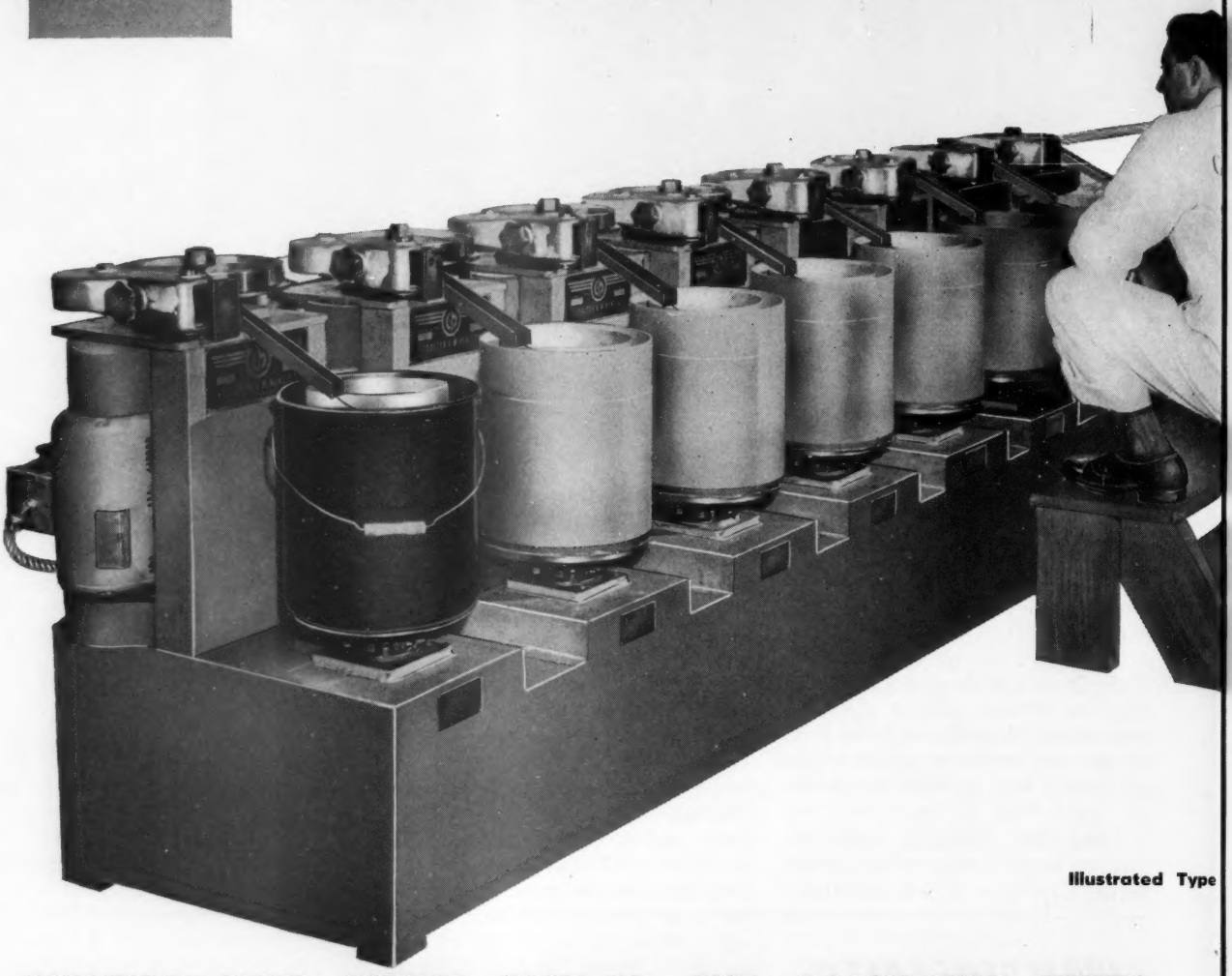

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Model	Std. Bare Wire Pkg. Wt.	Standard Package OD X HT X Construction	Optional Bare Wire Package Weight
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227	100	11" x 12½" Fibre or Steel	50 to 150
327	40	8" x 9½" Fibre or Steel	10 to 40

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SINCE 1843 BRIDGEPORT 3, CONNECTICUT, U. S. A. INCORPORATED 1881

Large Strand Galvanizing Unit Installed in West Coast Wire Mill

The description of this galvanizing unit will be of interest to many of our readers and is described here for their benefit.

Continuing their expansion and modernization program at the Los Angeles plant, **Bethlehem Pacific Coast Steel Corporation** officials recently announced first production on the plant's completely new wire galvanizing unit.

★ ★ ★

Termed the most modern and versatile hot dip wire galvanizing line in the industry, the new facility incorporates many of the major improvements in wire galvanizing equipment made in recent years.

★ ★ ★

Located adjacent to the present wire mill, the new line is 365 feet long and offers production versatility that is ideal in meeting the varied and expanding galvanized wire needs of Western customers.

★ ★ ★

Capable of handling 40 strands of wire at one time, the new equipment will galvanize wire in sizes ranging from 5/16 inch to 18 gauge. By using various combinations of speeds and setups on the take-up frames, various wire sizes can be galvanized simultaneously.

★ ★ ★

Also, when needed, strand annealed wire can be produced by by-passing the zinc-dip operation. This feature adds still another element of versatility to the equipment, to meet desired production schedules.

★ ★ ★

Wire stocks, drawn to desired diameters, begin their pass through the new galvanizing line at the pay-off reels, each rated at 1,000-pound capacity. Strands are first passed through tandem molten lead pans where they are submerged in the hot lead for annealling.

★ ★ ★

Next, a water rinse at normal temperature precedes a hydrochloric acid bath in two large granite tanks. Quarried from solid rock in one piece, these tanks each weigh in excess of eleven tons. For faster processing schedules, strands to be coated can be passed through both tanks in line.

★ ★ ★

Following a second water rinse, strands begin their pass through a solution of zinc-ammonium chloride flux to insure a tight bonding of the zinc coating to the wire. Thoroughly cleaned, strands are then passed through a molten zinc bath of 850°F., where they receive the protective coating that enables this wire product to withstand the corrosive elements of nature.

★ ★ ★

Either single or double galvanized wire will be produced, the final thickness of coating being a function of the immersion time in the hot zinc and the type of wipe used prior to spooling on the take-up frames.

★ ★ ★

Principal items to be produced on the wire galvanizing equipment recently installed by Bethlehem Pacific at Los Angeles include wire for fence manufacturing concerns, special galvanized wire for the lumber and wire bound box industry, and special galvanized wire and core wire to support high-voltage transmission lines. A complete line of galvanized merchant trade wire is to be produced on this new equipment.

View of galvanizing line.

THE ANNUAL CONVENTION of THE WIRE ASSOCIATION

November 14-17, 1955 • La Salle Hotel • Chicago, Illinois

A top-flite program has been arranged for your benefit that will include the following:

FERROUS PAPERS

Basic Principles of Continuous Wire Plating.
Phosphate Coatings for Wire.
Nail Cleaning, Weighing and Packaging.
Wire Descaling in Germany.
Wire Die, Shape and Finish.
Plastic Coating of Steel Wire.
Quality Control.
Customers' Needs for Quality Wire.

NON-FERROUS PAPERS

The Use of Draw-Paked Wire by The Wire Industry.
Progressive Work Hardening and Re-Annealing of
High Conductivity Copper.
Electrotinning with a Tin-Zinc Coating.
Drawing of Hard Alloy Aluminum Wire.
Chrome Carbide Dies for the Extrusion of Copper.
Reel Drive Selection.

INSULATED WIRE PAPERS

Insulations of Safety Mineral for Insulated Copper Wire Cable.
New Developments in Polyethylene Insulating Materials.
Enameling and Pre-Enameling Ovens.
Precision Solution Covering of Wire.

Symposium. Production Scheduling Based on Inventory Control

The foregoing lists of papers is not complete. There will be others equally valuable. On Wednesday, there are three features to which we call your attention: 1) The Annual Luncheon; 2) The Annual Business Meeting of members of the Association and in the evening, the annual Stag Smoker-Dinner. Don't miss any of them—They are all important and enjoyable. The Mordica Memorial Lecture "What Lies Ahead" will be delivered at the Annual Luncheon by John H. Corson, Manager of the Laboratory, Carpenter Steel Company. Awards for 1954 papers will also be made then.

Plant Inspection Tour: Members and guests are cordially invited to visit American Steel and Wire's Waukegan, Ill., plant on Thursday. This is a new plant. Busses start leaving at 8 A.M. Last bus at 9 A.M.

MAKE YOUR PLANS NOW TO ATTEND THIS CONVENTION
AN INTERESTING AND ENTERTAINING WEEK OF EVENTS
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THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

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Government Wire Production Information

Spectrographic Standard Samples of Tool Steels

Spectrographic standard samples of high-speed tool steels are now available from the National Bureau of Standards. Six different tool-steel standards, carefully analyzed and certified as to composition, have been added to the list of over 500 standard samples which the Bureau distributes to analytical and research laboratories for use in controlling chemical processes and maintaining the accuracy of equipment. Designed for calibrating and checking spectrographic methods of analysis, the new standards are complex alloys of iron, chromium, vanadium, molybdenum, tungsten, and cobalt, together with small amounts of other elements.

★ ★ ★

Since the early part of World War II, spectrographic analysis has been extensively applied to the analysis of ordinary steel and nonferrous alloys. Only recently, however, have spectrographic methods been sufficiently developed to permit analysis of complex alloys such as the tool steels used in high-speed machining of metals. Anticipating the application of spectrographic methods to high-alloy steels and the consequent need for standard samples, the Bureau began planning for the production of standard samples of the steel alloys several years ago. Industry cooperated closely with the Bureau, making important contributions in the planning, preparation, and analyses of the standards. The Bethlehem Steel Company prepared the several heats of metal with the desired compositions and fabricated the metal into rods. The American Iron and Steel Institute recently made a grant to the Bureau to assist the development of spectrographic standard samples; this fund facilitated the completion of testing and analyses of the new tool steel standards.

★ ★ ★

The tool-steel samples are in two forms: rod 7/32 inch in diameter and 4 inches long, and rod 1/2 inch in diameter and 2 inches long. The surfaces of the rods are finished by centerless grinding. Both forms serve as electrodes for spark excitation in spectrographic analysis.

★ ★ ★

The rods have a uniform fine-grain structure which results from hot-rolling and annealing of the cast metal. In this condition they can be applied directly to the analysis of molybdenum and tungsten high-speed tool steels prepared in a similar manner and in similar shapes. In applying the samples to the analysis of tool steels prepared by other means or in other shapes, care must be taken to evaluate any

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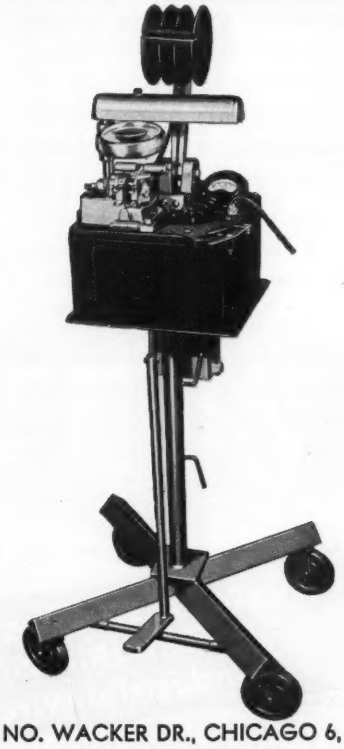
This welder was designed and developed expressly for welding all types of fine wire: Aluminum, Copper, Brass, Bronze, Steel and Steel Alloys, ranging in size from .005" to .020" diameter.

Unit design of frame, transformer and power sub-assemblies permit other range of sizes to suit requirements.

Equipped with a temperature indicating annealing and tempering device, voltage regulator and meter to compensate for voltage fluctuation, wire cutters, extra large 5" diameter magnifying glass, fluorescent light and extension cord. Welder can be supplied for bench mounting, or mounted on 4-wheel truck.

The adaptability of this unit for welding all types of wire, either ferrous or non-ferrous, in sizes from .005" to .020" diameter, makes it ideal for the fine wire manufacturer.



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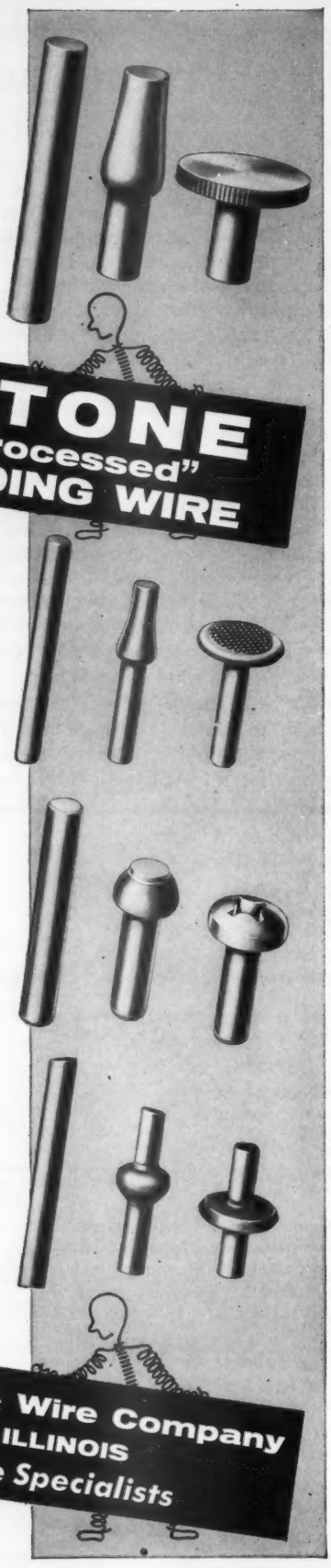

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"Special Processed"
COLD HEADING WIRE

The terrific displacement of metal during the cold heading process requires a wire that's *processed specifically* to meet the exact requirements of the job.

In plants where Keystone "Special Processed" Wire is specified for difficult cold heading, production records show these valuable results: (1) increases the production rate which *lowers cost per unit;* (2) greatly prolongs die life which *reduces machine down-time and labor costs;* (3) provides higher quality finished products which *minimizes rejections and inspections.*

Call on our wire specialists for assistance on any problem concerning steel wire. Contact your Keystone representative or write direct.

Keystone Steel & Wire Company
PEORIA 7, ILLINOIS
Industrial Wire Specialists

possible effects of differences in physical condition on the analyses.

★ ★ ★

The homogeneity of the rods, both in cross section and along their lengths, was studied by spectroscopic and metallographic methods at the Bureau. The samples were found to be of suitable homogeneity for the elements for which concentrations are certified. Chemical analyses of representative rods were made by Bethlehem Steel Co. (Bethlehem Works), Cleveland Twist Drill Co., Crucible Steel Co. (Halcomb Works), Carpenter Steel Co., and the National Bureau of Standards.

★ ★ ★

The tool-steel standards may be obtained from the National Bureau of Standards for a fee of $8.00 each. A provisional certificate supplied with the standards gives average values of the analyses by the cooperating laboratories. The compositions and sizes of the standards are given in Table 1.

Table 1. Compositions of NBS Spectrographic Standard Samples of Tool Steels

Sample Nos.		Mn %	Si %	Cu %	Cr %	V %	Mo %	W %	Co %
436	836	0.21	0.32	0.075	6.02	0.63	2.80	9.7	—
437	837	.48	.53	—	7.82	3.04	1.50	2.8	2.9
438	838	.20	.17	.17	4.66	1.17	8.26	1.7	4.9
439	839	.18	.21	.12	2.72	1.50	4.61	5.7	7.8
440	840	.15	.14	.059	2.12	2.11	.070	13.0	11.8
441	841	.27	.16	.072	4.20	1.13	.84	18.5	—

1/ Sizes: 400 series; rods 7/32 in. diam., 4 in. long
800 series; rods 1/2 in. diam., 2 in. long

A Rotating Reading Head for Magnetic Tape and Wire

A reading head that makes possible the close examination of a short section of magnetic tape or wire is now being used at the **National Bureau of Standards** to locate and investigate faults in magnetic recording media. Developed by **J. R. Sorrells** of the NBS data processing systems laboratory, this instrument makes use of a reading head mounted on a rapidly rotating drum so that the head is in contact with the tape for a part of each revolution. Since the tape is held stationary, the head reads exactly the same set of signals once each revolution and

the playback can be displayed continuously on an oscilloscope and observed as long as desired.

★ ★ ★

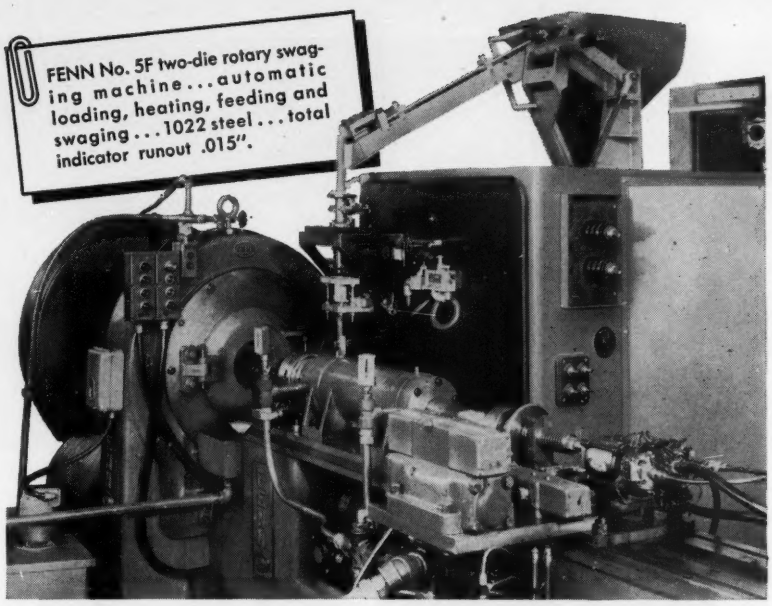
In addition to providing a means for closely examining the playback signals from a specific portion of the tape, the reader can be used to scan through and edit a complete tape. The observer can easily locate any defective signals along the entire length of the recorded tape. Interchangeable parts provide a means for examining several different sizes of magnetic tape or wire.

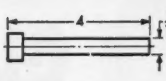
★ ★ ★

In the design and development of magnetic tape and wire equipment for external pulse storage in electronic digital computer systems, one of the primary considerations has been reliability of operation. An important factor in magnetic storage is the condition of the tape surface itself. Errors in operation can be caused by any of several types of tape faults such as "holes" and raised spots in the magnetic surface, or creases in the tape. Very often the loss of several pulses or the gain of a single pulse may be caused by a flaw that is too small to be visible to the unaided eye. Conventional means of tape reading are not suitable for locating errors, since in the usual tape transport mechanism the tape is moved continuously past a stationary head. In investigating tape for faults it is desirable to read a small specific portion of the tape over and over again at a rapid rate, and to display on an oscilloscope a steady, clear picture of the playback signals. The rotating head reading device developed at NBS provides such a repetitive method for examining tape. Once faults are located, they can be removed or else avoided in the future, thus increasing the reliability of the tape.

★ ★ ★

In addition to being an effective and useful means of investigating magnetic recording phenomena, the rotating-head type of the reader could also be used as a means for transcribing information directly from the keyboard to the


FENN No. 5F two-die rotary swaging machine... automatic loading, heating, feeding and swaging... 1022 steel... total indicator runout .015".

Change  **to**

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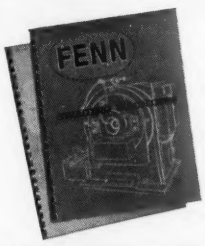

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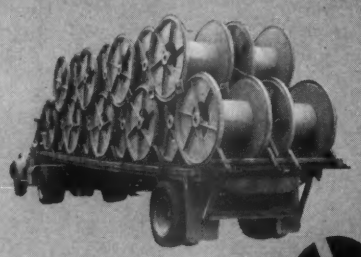
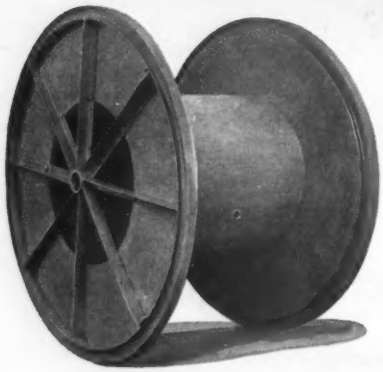


NYECO Steel Shipping Reels



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magnetic tape. It would be most convenient to use a multichannel tape together with some provision for advancing it in short, precise steps. Each time a key on the keyboard is pressed, the corresponding character in coded form is set up in an electronic register. Then at a specific point of the rotating drum revolution, the contents are recorded on the tape in parallel form. On the next revolution of the drum, the character just recorded is compared with the character stored in the register. If the two agree, the tape advances a small distance, and the next key can be depressed to begin the next record-read-check cycle. If the two characters do not agree, the tape advance mechanism is locked out, an error indicator flashes, and the operator can either try to record again or find where the difficulty is. In this way, an operator could transcribe his problem directly from his manuscript to a magnetic tape, which then could be read directly into the computer.

ABSTRACTS

FLUID LUBRICATION IN WIRE DRAWING

D. G. Christopherson, H. Naylor. Wire Prodn 1955 Vol 5 (5) pp 4-5, 7-10, 12 (Apr)

Paper to Inst Mech Engs mtg, Apr 1, 1955. Importance of effect of die wear on production stressed, despite great hardness of die materials (diamond, tungsten carbide). Eg, for copper wire drawn through tungsten carbide die, increase in bore dia through wear may be approx 10^{-5} in. per 10,000 ft. drawn. With drawing speed 6,000 ft/min and dia variations up to 10^{-3} in. acceptable, die must be changed after 2 hr. Experimental and theoretical work on wear modification by lubrication detailed. 4 tables.

Y* **C 11.0**

★ ★ ★

INVESTIGATION OF THE MECHANICS OF WIRE DRAWING

J. G. Wistreich. Engineer 1955 Vol 199 (5177) pp 514-515 (Apr 15)

Abstr of paper to Inst Mech Engs mtg, Apr 1, 1955, with discussion of this and 'The promotion of fluid lubrication in wire drawing', by D. G. Christopherson and H. Naylor (see above).

Round wire was drawn slowly and without backpull through dies with bores in shape of truncated cones to study relations between external forces and process parameters. Not only drawing force, but also means die pressure and mean coeff of friction measured, to test existing wire drawing theories. Weaknesses in all theories revealed; use of R. Hill and S. J. Tupper's (1948) sheet-drawing theory for wire drawing not justified. Semi-empirical formulae devised for forces; no correlation between die pressure and coeff of friction.

In discussion, P. Grodzinski referred to problem of optimum angle, and to need for experimental values for different types of die and materials. Ref to own suggestion of considering relative length of contact between wire and die in reduction zone as well as die angle and reduction; need for experimental work in this direction.
Y* **C 11.0**

★ ★ ★

PATCH EFFECT FOR THE THERMIONIC EMISSION FROM POLYCRYSTALLINE TANTULUM
W. B. Laberge, R. J. Munick, J. A. Dezoteux, J. F. Whalen, E. A. Coomes (Notre Dame Univ). Journ Appl Phys 1955 Vol 26 (2) pp 241-243 (Feb)
Tests conducted on 0.001, 0.003 and 0.005 in. unpolished and polished tantulum wires. Results discussed. 4 illustr, 8 ref, 1 table.
Y* **C 11.0**

★ ★ ★

ERLEICHTERTES ARBEITEN MIT DEM 'ALFAMETER'. WORK FACILITATED THE USE OF THE ALFAMETER
W. Lueg. Draht 1955 Vol 6 (4) p 133 (Apr) (In German)
Description of new external measuring device incorporated in optical instrument for measuring cone angles of drawing dies. 3 illustr.
G **D 11.0 : D 15.0**

★ ★ ★

METHODES MODERNES DE MESURE ET DE CONTROLE DES FILIERES, MATRICES, ETC. MODERN METHODS OF MEASURING AND CONTROLLING THE PROFILES OF DIES ETC
W. Lueg. Machine Mod 1955 Vol 49 (552) pp 5-8 (Apr) (In French)
Description of principle of Alfameter for measuring die angles, Zetmeter for measuring bearing length, and Panohol for investigating die walls. 15 illustr.
G **D 11.0 : D 15.0**

★ ★ ★

DRAHTMESSUNG IM DURCHLAUF NACH DEM PNEUMATISCHEN SOLEX-MESSVERFAHREN. CONTINUOUS MEASUREMENT OF WIRE DIAMETERS WITH THE PNEUMATIC SOLEX MEASURING METHOD
H. Schulz. Draht 1955 Vol 6 (4) pp 134-136 (Apr) (In German)
10 illustr. **G** **C 11.0 : D 15.8**

★ ★ ★

NEW MEASURING INSTRUMENT FOR RESISTANCE WIRES BETWEEN 10 AND 250 MICRON DIAMETER
Anon. Ind Diamond Rev 1955 Vol 15 (174) pp 95-96 (May)
New electrical measuring instrument for variations in resistance developed, having accuracy of at least 0.1% of wire resistance. Bridge circuit uses rectified AC. Comparison measuring method applied. Variations in voltage of grid have practically no influence. Records of molybdenum wires of 100 micron dia shown. 3 illustr. **G** **C 11.0**

★ ★ ★

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METAL MANUFACTURING COMPANY
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Outstanding Personalities of the Wire Industry

Porter Promotes Webster

J. G. Geddes, President of **H. K. Porter, Inc.,** Somerville, Massachusetts, manufacturers of Porter Metal Cutters, Porter Pruners, and the P-F Line of Automotive Tools and Equipment, announces the following organizational change, effective June 1st. **Harry M. Webster,** previously Sales Manager of the Cutter and Industrial Division, has now been promoted to Sales Manager of Trade Sales, in charge of all Cutter, Pruner, and Automotive Trade Sales.

Naugatuck Chemical Appointments

Three major organizational changes in the sales, production and development departments of **Naugatuck Chemical** division, **United States Rubber Co.,** have been announced by **John E. Caskey,** vice president and general manager.

Earle S. Ebers, formerly director of research and development, has been named general sales manager for the division; **D. Lorin Schoene,** formerly assistant director of research and development, has been appointed director of research and development for the division; and **F. Dudley Chittenden,** formerly factory manager of the division's Painesville, Ohio, plant has been made production manager for the division.

* * *

The three men, respectively, will have responsibility for all sales, research and production operations. Naugatuck Chemical operates plants in Naugatuck, Conn.; Painesville, Ohio; Los Angeles, Calif.; Joliet, Ill., and Baton Rouge, La. It manufactures more than 350 various chemical products, including rubber chemicals, agricultural chemicals, synthetic rubber, latex compounds, and plastics.

At the same time, Mr. Caskey announced that **Robert E. Casey,** formerly general sales manager, has been appointed marketing coordinator for the division and that **C. H. Madsen,** formerly production manager, has been named product manager for chemicals and explosives on the general manager's administrative staff.

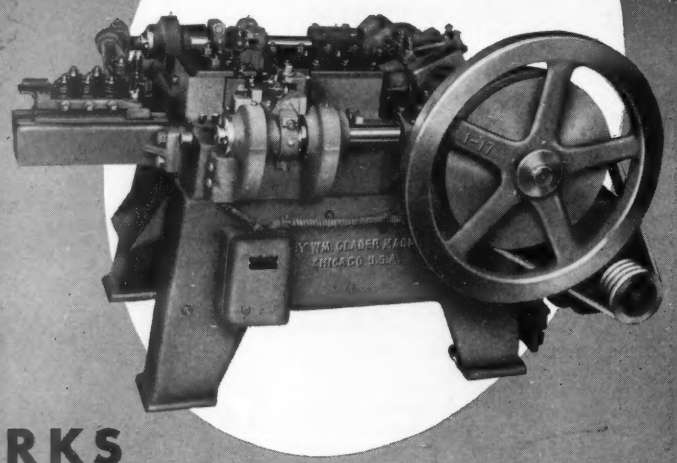
Elected Chairman of Pittsburgh Chapter of Carbide Engineers

Thirty-eight Pittsburgh district engineers have formed the Pittsburgh Chapter of **The Society of Carbide Engineers.**

* * *

Malcolm Judkins of **Firth Sterling, Inc.,** an honorary life member of the national society, was unanimously elected chairman. **J. J. Sowko** and **J. M. Stokes,** also of Firth Sterling, Inc., were elected vice-chairman and secretary re-

high efficiency — low cost
with GLADER wire nail machines



Eliminate costly down-time in the Nail Mill by replacing obsolete machines with new GLADER NAIL MACHINES . . . For tops in efficiency and economical operation use GLADERS.

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MACHINE WORKS

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Export Dept.: 122 East 42nd Street, New York 17, N. Y.

spectively. **C. W. Powell,** Carboloy Division, was elected treasurer. Directors are **R. J. Steele** and **W. J. Loach** of Firth Loach, and **E. L. Lunstedt,** Oberg Manufacturing Company.

★ ★ ★

The purpose of the chapter is to explore and disseminate technical information on carbide and carbide tooling. Mr. Judkins stated that the organization was for the mutual benefit of manufacturers and users of carbide materials, and that the membership should make every effort to expand its ranks to include engineers, designers, and maintenance personnel for the dissemination of technical and practical information to all concerned.

Made Assistant Director of Purchases

Thomas G. Lewis, a veteran of 30 years with **The Youngstown Sheet and Tube Company,** has been appointed assistant to **H. H. Waldschmidt,** director of purchases.

In his new position, he will supervise the purchases for special projects including the larger construction programs.

★ ★ ★

A native of Youngstown, Mr. Lewis joined Sheet and Tube in 1925 as an office boy in the purchasing department. In 1926, he transferred to the seamless tube mill as a piercer operator but returned to the purchasing department in 1928 as an invoice clerk. He became chief invoice clerk in 1940; chief clerk in 1945 and buyer in 1946.

Names Sales Manager for Industrial Division

Walter B. Morehouse has been appointed General Sales Manager of the Industrial Division of the **Nopco Chemical Company,** according to a recent announcement made by **G. Daniel Davis,** Executive Vice President.

★ ★ ★

He will also be in charge of the Sales Division of the Metasap Chemical Company, a subsidiary of Nopco, which produces insoluble metallic stearates for a great many industries including the manufacture of paint, varnish, lacquer, grease, plastics, ink, metallurgy, construction materials, textiles, cosmetics, ceramics, and paper.

★ ★ ★

A chemistry major, Mr. Morehouse is a graduate of the College of Forestry of the State University of New York. He has been associated with Nopco since 1940 and was named an Assistant Vice President of the company in 1953.

Appointed to New Posts by CF&I

Neil E. Kile has been appointed Plant Manager of the Clinton, Mass., plant of **The Colorado Fuel and Iron Corp.,** it was announced by **F. G. Lindstrom,** New England District Manager. Mr. Kile was formerly Sales and Product Manager of the Mechanical Specialties Department.

★ ★ ★

Mr. Kile will be succeeded by

CAMDEN WIRE CO., INC.

Wire Fabricators

Producers of Quality Fine Wire Copper Conductors

EXTRA FLEXIBLE CONDUCTOR STRANDED OR BRAIDED

MULTIPLE ENDS OF SIZES .008 to .002

BARE · TIN or LEAD COATED · SILVER PLATED

Special Heavy Tinned Conductors for Hook-up Wire

40 MASONIC AVENUE • **CAMDEN, NEW YORK**

Ralph W. Ramer, whose appointment as Sales and Product Manager of the Mechanical Specialties Department was announced by **L. A. Watts,** General Manager of Sales.

★ ★ ★

Mr. Kile has been associated with CF&I's Wickwire Spencer Steel Division plant at Clinton since 1945, when he took charge of the design and installation of the plant's space cloth department. Prior to that time he had operated his own company, the **Westboro Wire Weaving Company.**

★ ★ ★

He also has been associated with the **Ludlow-Saylor Wire Cloth Co.,** St. Louis, Mo., and with the **W. S. Tyler Company,** Cleveland, Ohio.

★ ★ ★

Ralph W. Ramer has been associated with CF&I since 1943. In 1952 he was appointed assistant to the Mid-Western District Manager, after having served since 1947 as Sales representative for the Company's **Wickwire Spencer Steel Division.**

Titan Head Honored by Penn State

William W. Sieg, president of **Titan Metal Manufacturing Company,** Bellefonte, Pa., was presented in June with the Distinguished Alumnus award of the Pennsylvania State University, being one of five alumni so honored.

★ ★ ★

The honor was conferred by president **Milton S. Eisenhower** before a group of nearly 1,000 alumni who had returned to the campus for their class reunions. **Judge James Milholland,** of Pittsburgh, as president of the board of trustees, presented the bronze medallion, memorializing his services to his local community, to his state, to the country and to international affairs. Penn State had previously honored him with the David Ford McFarland Award for achievements in the field of metallurgy.

Crucible Steel Promotes Two Engineers

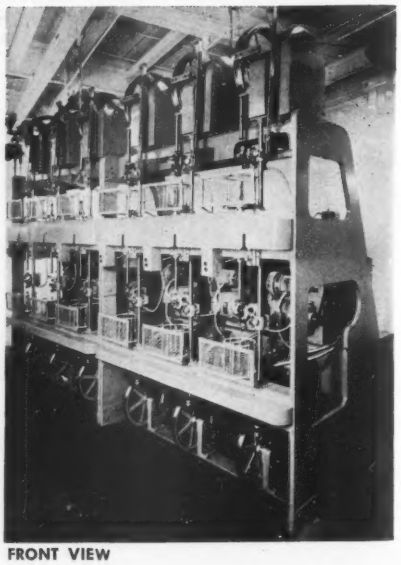
Crucible Steel Company of America has appointed **J. D. Dickerson** to the staff of the Central Operating Department with headquarters in the Oliver Building, Pittsburgh, according to an announcement by **L. L. Ferrall,** Vice President of Operations. Mr. Dickerson had been Chief Metallurgist at the Company's Midland, Pa., Works.

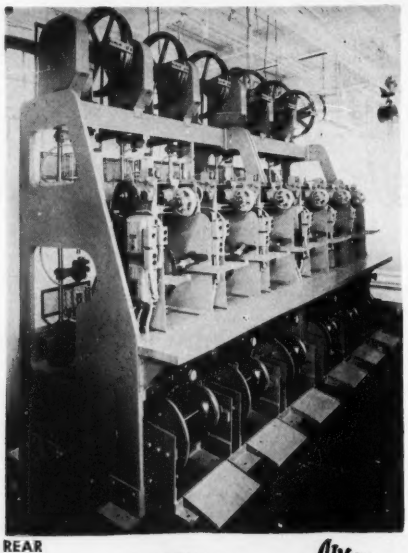
★ ★ ★

Concurrently, D. I. Dilworth, Jr., Director of Metallurgy, announced that **C. S. Walton,** former Staff Metallurgist, has been named to succeed Mr. Dickerson as Chief Metallurgist at Midland.

★ ★ ★

Mr. Dickerson was graduated from Lehigh University in 1931 with a Bachelor of Science degree in Metallurgical Engineering. During World War II, he served with the Ordnance Corps, U. S. Army, in the European Theater of Operations as Assistant Chief, Research


FRONT VIEW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3D-6-MBB TAPING MACHINE #1107

Applies double cover to 6 lines of wire simultaneously. Nominal wire range #6 to #18 B & S gauges (.162" to .040" or 4.116 MM to 1.024 MM). Standard Capstans 24" in diameter. Supply wire let-offs and torque motor driven take-ups for 24" diameter reels are at rear of machine.

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and Intelligence Branch, Metals Section, studying the ordnance and steel industries of Germany and occupied countries. He held the rank of Colonel.

★ ★ ★

Mr. Walton was graduated from Ohio State University with a Bachelor of Metallurgical Engineering degree. After two years' service with the United States Navy and seven years in industry Mr. Walton joined Crucible in 1953 as a Staff Metallurgist assigned to the Central Metallurgical Office in Pittsburgh. The next year he was made a Staff Metallurgist at the Company's Midland, Pa., Works, the position he held until his present appointment.

To Represent Borax Concern in Australia

The Pacific Coast Borax Co., Division of **Borax Consolidated, Limited,** has announced the appointment of **B. L. Winter** of Sydney, Australia, as Borax Consolidated's technical field representative in Australia. Mr. Winter at present is traveling throughout the U. S. and Canada to become familiar with the Company's work. He is a graduate of Hawkesbury Agricultural College and of Sydney Technical College of Australia.

To Manage Mechanical Goods Division for U. S. Rubber

G. Allen Lovell has been elected a vice president of **United States Rubber Co.** and appointed general manager of its mechanical goods division, effective July 1st.

★ ★ ★

He was formerly assistant general manager of the division, a post to which he was appointed last November. He joined the company in 1918 at the Williamsport plant and has risen steadily.

★ ★ ★

The mechanical goods division operates plants in Passaic, N. J., Fort Wayne, Ind., Philadelphia, Bristol, R. I., Chicago and Sandy Hook, Conn. It makes insulated wire and cable and many other industrial products.

Technical Service Supervisor Appointed by J&L

An appointment in the technical services division of **Jones & Laughlin Steel Corporation** has been announced by **Howard S. Turner,** vice president—research and development.

★ ★ ★

Lewis U. Davis has been appointed supervisor—product technical services, hot rolled, cold finished, wire, and tubular products section.

★ ★ ★

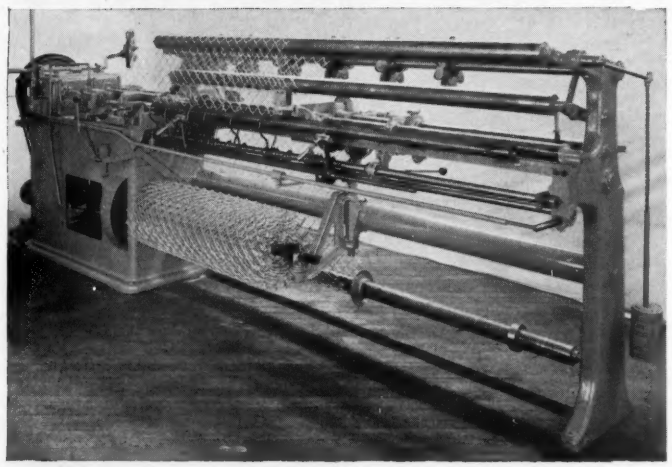
He has been a contact metallurgist for J. & L. for the past ten years, serving customers in the Detroit area. In his new capacity, he will supervise metallurgical engineers providing product technical services to J. & L. customers.

Norton Appoints Coast Representative

Edwin R. Reed has been appointed resident demonstrator for

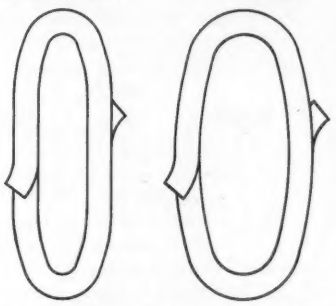
INVINCIBLE Chain-Link Fence Machines • **Greatest in Wire Fencing!**

"SEEING IS BELIEVING"
Come and See It—Advise When



Keeps its form best against rough usage

End view of the Spirals:
Invincible Others



In weaving the two wires there are 4—½ turns per mesh.

Invincible's high production cuts the wage cost. It also saves power, floor space, and WIRE. With normal care the Invincible's Modern Construction gives a long life. Our capacity in building Invincibles is as yet limited. It is the machine you will "eventually buy". It gives a real chance for an increase in profits. It will pay to get in on one quickly.

ARTHUR BLASHILL & COMPANY
Temporary Office: 78 Downing Street
WORCESTER 10, MASSACHUSETTS, U. S. A.

the Grinding Machine Division of **Norton Company** in the Los Angeles area. Mr. Reed had formerly been a demonstrator in Chicago. He will make his headquarters at the **Moore Machinery Company,** 3200 South Garfield Avenue, Los Angeles.

★ ★ ★

Leonard C. Mattson succeeded Mr. Reed in the Chicago area, with headquarters at the Norton Chicago district office. Mr. Mattson was formerly at Norton's main plant in Worcester, Mass.

Joins the Ironsides Company

Oscar L. Maag, internationally known lubrication engineer, has become associated with **The Ironsides Company,** lubrication specialists of Columbus, Ohio, and Liverpool, England, it has been announced by **Hugh M. Bone,** Ironsides' president.

★ ★ ★

Mr. Maag, who will serve as Ironsides' consultant, recently retired as research chemist and chief lubrication engineer of Timken Roller Bearing Company where, during a 32-year career, he was credited with many major improvements in industrial lubrication techniques.

★ ★ ★

Among these is the Timken Lubricant Tester which measures the load-carrying ability of bearing and gear lubricants. This device aided greatly in the development of extreme pressure lubricants which make possible today's high speed mills. He is the author of many articles as well as a lecturer on lubrication.

Acheson Appoints Export Sales Supervisor

Paul M. Barnes has been named Export Sales Supervisor of **Acheson Colloids Company,** Port Huron, Mich., according to **M. W. Reynolds,** General Manager. Mr. Barnes comes to this newly created post with a background of experience in international commerce. Following matriculation at New Mexico A & M, Mr. Barnes studied at the American Institute for Foreign Trade. Previous to joining Acheson earlier this year, he was Assistant Sales Manager of Union Starch and Refining Company's Export Division.

Appointed Executive Vice President of Nopco

G. Daniel Davis has been named to the post of Executive Vice President of the Nopco Chemical Company, Harrison, N. J. The announcement was made by **Ralph Wechsler,** President of Nopco, following a recent meeting of the Board of Directors.

★ ★ ★

In his new position, Mr. Davis will have full responsibility for the operation of the Industrial Division of Nopco including sales, production, and product development. As one of his first concerns, he intends to make a study of the sales operation of the division to determine how it can be improved and expanded for the most efficient han-

After The Twinner,

. . . THE THREE WIRE TWISTER

PRODUCTIVE:

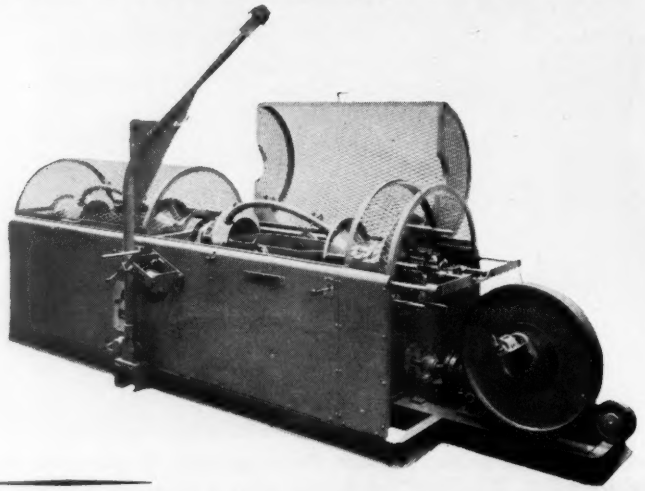
300 to 1000 r.p.m. reels:
let-off: 18" and 24" diameters
single or dual take-up:
up to 42"

SURE:

—adjustable tension
—convenient for fine copper wires (26 AWG)
—each reel on ball bearings
—dual drive
—minimum lay 3/4"
—spark tester
—automatic stop motion
—crane for loading

FLOOR SPACE REDUCED:

18" type: length = 12'



POURTIER MACHINES

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ROMAINVILLE (Seine) **FRANCE**

dling of the company's growing sales.

★ ★ ★

Starting with Nopco in 1916 as a shipping clerk, Mr. Davis has been associated with almost every department of the company, with special emphasis on sales and on the development of new products, from the research laboratory to the production stage. He was appointed a member of the Board of Directors and Secretary of the company in 1923, and became a vice president in 1937.

New Assignments for Oakite Representatives

Oakite Products, Inc., manufacturers of industrial cleaning and metal treating materials, have announced the appointment and transfer of several technical service representatives.

★ ★ ★

William H. Duckworth, formerly a production foreman with General Motors, is now serving the metal industries in South Milwaukee. He replaces **R. J. Baltzell,** who has been transferred to the Elmira, New York territory.

★ ★ ★

George F. Becker is the new representative in the metal industry in Kansas City, Missouri, replacing **Otto W. Jommersbach,** transferred to the Brooklyn-Queens area in New York City.

★ ★ ★

Elected Director of Controllers Institute

Roger A. Yoder, secretary-treasurer, **Detroit Steel Corporation,** Detroit, was elected a director of the Controllers Institute of America at the organization's annual meeting of members. The latter was held in conjunction with the 1955 Eastern Conference of the Institute.

★ ★ ★

Mr. Yoder has been active in the controllers organization since 1941. He was president of its Detroit Control in 1950-51. He also served for two years as chairman of the National Planning Committee of the Institute, in 1953-55.

★ ★ ★

Established in 1931, the Institute is a non-profit management organization of controllers and finance officers from all lines of business—banking, manufacturing, distribution, utilities, transportation, etc. The total membership exceeds 4,400.

Promoted by Sheet and Tube in New York

Richard J. Stamberger, New York district sales representative for **The Youngstown Sheet and Tube Company,** has been appointed assistant New York district sales manager, it has been announced by **J. M. Tuthill,** general manager of sales.

★ ★ ★

Mr. Stamberger started with Sheet and Tube in July of 1940 and has served as a salesman in the Company's Indianapolis, Columbus

SEE THE DIFFERENCE YOURSELF...
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Superior MPS
NO-CREV SPOOLS
No-Crev Spools eliminate the conventional crevice at the inner junction of spool head and barrel. No more production slow-ups due to fine wires getting caught in such a crevice. You can now have continuous trouble-free high speed winding.
We invite your inquiries — let us tell you more about No-Crev Spools. Write us today.
MPS
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give you brute strength with dimensional precision, concentricity, and balance. Another patented MPS development engineered to help you!
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Telephone Attleboro 1-0848
#108

and Detroit district offices. He joined the New York sales office in March of 1952.

★ ★ ★

He is a graduate of Ohio Wesleyan University where he received a Bachelor of Arts Degree in political science.

C.F.&I. Man Heads Wire Reinforcement Institute

Richard H. Frizzell, sales manager of the structural products department, **Wickwire Spencer Steel Division** (Buffalo, N. Y.) of the **Colorado Fuel and Iron Corporation,** has been elected president of **Wire Reinforcement Institute, Inc.**

★ ★ ★

The Institute, with headquarters in Washington, D. C., is a nonprofit trade association of the manufacturers and producers of over 95 percent of the steel welded wire fabric used in this country and possessions. Fabric is used to reinforce portland cement concrete highways, buildings, reinforced concrete pipe and concrete work in and around homes.

As President of the Institue, Mr. Frizzell will guide a broad program of research and education aimed at improving both welded wire fabric and the product it reinforces, and at extending its uses.

Furnace Builder Receives Trinks Award

Horace Drever, President of the Drever Company, Philadelphia, industrial furnace builder and pioneer developer of furnace for improved heat treating, received the Trinks Award, the nation's top honor for achievement in the industry, on May 9th.

★ ★ ★

A judges' panel of industrial heating authorities bestows the Award among candidates nominated by the industry for outstanding contributions to progress in that field. It was established in honor of **Dr. Willibald Trinks,** professor emeritus of Carnegie Institute of Technology and world authority on industrial heating problems.

★ ★ ★

Mr. Drever was selected by the Award Committee for his creative work on industrial furnaces which has contributed greatly to the production of strip metal, armor plate, and stainless steel wire and tubing.

★ ★ ★

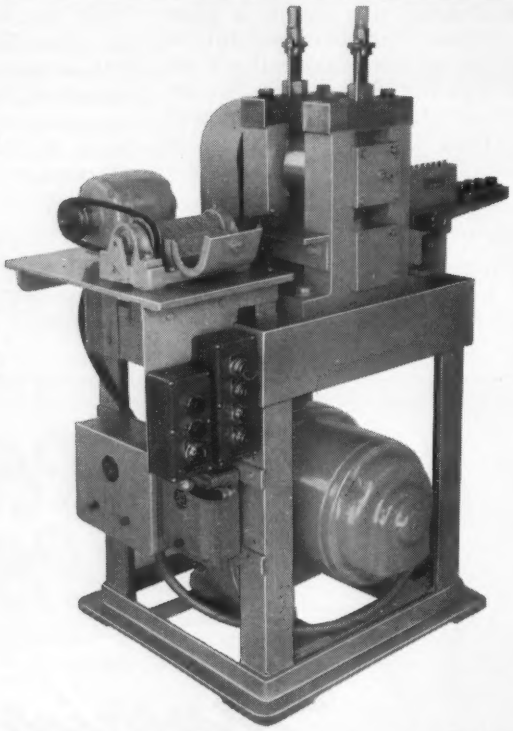
In making the Award, **I. Stanley Wishoski,** editor of Industrial Heating, cited Mr. Drever for development of the continuous vertical strip annealing furnace, for originating the present-day accepted method of bright-annealing stainless steel wire and tubing, and for developing the furnaces and quenching equipment that make possible the continuous heat treating of armor plate.

★ ★ ★

Mr. Drever is a graduate of Pennsylvania State College. He began his professional career with the Electric Furnace Construction Company, rising to chief engineer. He was later chief engineer and a vice president of the Gas Equipmen Engineering Company. Mr. Drever formed his own company in 1938.

New

ROCKWELL *Flat Wire* ROLLING MILL



a Completely Packaged Mill Ready to Run

- For cold reduction of round wire to flat wire.
- Removes kinks, bends and peripheral cast from coil before the wire is cold reduced, and polishes it to produce bright straight wire.
- Prevents wandering which causes crooked finished wire.
- Rolled flat wire passes through edging rolls which keep it in alignment and also smooth and brighten the edges.
- Unique roll design reduces maintenance.

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FURNACES • OVENS • BURNERS • VALVES • SPECIAL MACHINERY

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Sales Representatives in Principal Cities

Elected Vice President of Sprague Electric

Appointment of **Albert H. Postle** as sales engineer for ceramic capacitors and printed circuits has been announced by **Neal W. Welch,** vice president in charge of sales of the **Sprague Electric Co.,** North Adams, Mass.

★ ★ ★

Mr. Postle will specialize in application engineering of these products for the radio and TV industry, spending much of his time in the field with end users of these components. He was formerly assistant manager of Sprague's Production Engineering division.

Named a Vice-President of Rome Cable

Directors of the **Rome Cable Corporation** have elected **Glenn Koger** a Vice-President of the corporation.

★ ★ ★

Mr. Koger joined the Rome Cable Corporation in March 1954, and was made manager of the company's plant in Torrance, Calif., in July of that same year. He will continue in that capacity.

★ ★ ★

Before joining Rome Cable, Mr. Koger, was with **Walker Bros.,** manufacturers of electrical construction materials, in Conshohocken, Pa., for six years, as Vice-President in charge of copper products, and a director of the company.

★ ★ ★

Earlier he was with the **General Electric Company** for 19 years, and for 5 years of that time was head of the Engineering Department of the Insulated Wire Division. He is an electrical engineering graduate of Kansas State College, class of 1929.

★ ★ ★

The headquarters and main plant of the Rome Cable Corporation are at Rome, N. Y. The plant at Torrance, Calif., produces electrical metallic tubing and rigid conduit, and special tubing for industrial and fabricating uses. It is the sole licensee of the Sendzimir hot dip galvanizing process in the manufacture of steel tubing.

To Manage Technical Sales Service

Hugh W. Paul has been appointed Manager of Technical Sales Service of the **L. O. F. Glass Fibers Company,** according to an announcement by **J. M. Johns,** Vice President and Director of Sales of the company. He will make the general offices in Toledo his headquarters.

★ ★ ★

In his new position, Mr. Paul will supervise all technical service to the sales divisions and customers of the firm. Products on which this service will be provided are glass fiber textile yarn and roving, bonded mat, thermal and acoustical insulation, glass and quartz micro-fibers, compressed glass fiber board, laminated plastic panels and aircraft insulation blankets.

DIADUST

The finest always costs a little more

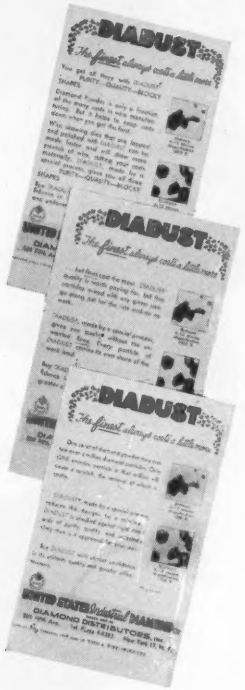
Some time ago we set out to prove that, in Diamond Powder, *quality* speaks for itself.

Ours is a simple story. The best in Diamond Powder means three things:

1. **PURITY—freedom from contamination.**
2. **QUALITY—uniform grading that never varies from one shipment to another.**
3. **SHAPE—blocky shapes with hard-cutting, long-lasting points.**

The best in Diamond Powder means DIADUST*.

We will continue to maintain these high standards always.



*Registered

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Bridgeport Brass Promotes Three Men

Three promotions to key positions in the **Bridgeport Brass Company** have been announced by **Herman W. Steinkraus,** president and chairman. The expansion of the Company's physical properties has resulted in the growth of its managerial operations requiring some reorganization.

★ ★ ★

Gilbert C. Mott, chief industrial engineer, has been appointed Director of Engineering. He joined Bridgeport Brass in 1937 as a trainee, following his graduation from MIT with a B.S. degree. He has served successively as a technical assistant in the tube mill, time study engineer, junior mechanical engineer, process engineer and chief industrial engineer.

★ ★ ★

John F. Kiernan, chief plant engineer, has been appointed Chief Engineer. He joined Bridgeport Brass in 1936 as a mechanical engineer and became chief plant engineer in 1950. He has done important engineering work, including major assignments on the rolling mill in Bridgeport constructed in 1938 and all plant and equipment expansion at Bridgeport and Montreal. He is a graduate of Wentworth Institute.

★ ★ ★

Joseph P. McNamara, assistant secretary and counsel, has been appointed Assistant to the President. In this assignment, Mr. McNamara will supervise the Company's industrial relations program and continue with some legal assignments.

Rem-Cru Announces Appointments

To give better technical service to titanium users, **Rem-Cru Titanium, Inc.** has transferred **J. A. Manfre,** formerly Supervisor of Process Engineering and Control at its Midland Plant, to the West Coast as Supervisor of Technical Sales Service. In announcing the change, **C. I. Bradford,** President and General Manager of Rem-Cru, said, "Mr. Manfre's new assignment is another constructive step in Rem-Cru's active program aimed at improved technical service to customers. It means that Mr. Manfre's 3½ years of Rem-Cru production and quality control experience will be readily available to our West Coast customers." He received his B. S. in Metallurgy from Penn State in 1943. Before joining Rem-Cru in 1951 he worked for eight years as a metallurgist at Babcock and Wilcox Tube Company.

Aetna-Standard Promotes Two

The Aetna-Standard Engineering Company, Pittsburgh, Pa., announced recently the appointment of **L. G. Murray** as Manager of Aetna's Export Sales. He joined the Engineering Department in 1937 and later supervised installation of equipment for Aetna-Standard's Flat Products Division. He was transferred to the Export Department in 1950.

★ ★ ★

At the same time **A. J. Morgan** was appointed Sales Manager of Sheet and Strip Equipment. He joined the Engineering Depart-

REDUCE BREAKAGE
LOWER COSTS
WRAP BETTER
with
"Arksafe"
CRINKLED KRAFT
WIRE WRAP!

Quick delivery of plain or waxed single ply crinkled kraft; asphalt or non-staining resin laminated; polyethylene coated or polyethylene laminated. Reinforced for extra strength when needed.

In sizes to fit your present equipment.

For details write Dept. WP-3.

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Plants: Chicago, Illinois, and Newport News, Virginia

ment in 1936. In 1940 he became Proposal Engineer for the Flat Rolled Division and in 1952 he was appointed Assistant Sales Manager of Sheet and Strip Equipment.

Alloy Metal Wire Appoints Detroit District Sales Manager

Roy Barbier has been appointed Detroit District Sales Manager for **Alloy Metal Wire Division.** He will handle sales of both Alloy Metal Wire and Riverside Metal Divisions of **H. K. Porter Company, Inc.** Mr. Barbier has been a salesman with Riverside since 1949, covering Michigan, upper Ohio and Indiana.

★ ★ ★

A graduate of Michigan State College with a degree in Business Administration, his experience with Riverside and his familiarity with the metal working and electrical markets make him ideally suited to serve the Division's customers.

Joins Carboloy Staff

Frank M. Mansfield III, manager of product programming, has been appointed manager of product planning and marketing research for **Carboloy Department of General Electric Company,** Detroit.

★ ★ ★

Mr. Mansfield joined Carboloy early in 1954. He formerly was associated with Torrington Co., as manager of the Cincinnati district, and as Detroit district engineer.

★ ★ ★

A World War II veteran, he served in the Army Air Corps, being released as a captain in 1946. He is a mechanical engineering graduate of Rennselaer Polytechnic Institute.

Rea Magnet Wire Elects New Officers

At a recent meeting of the board of directors of the **Rea Magnet Wire Company, Inc.,** Fort Wayne, Ind., the following officers were elected: **Robert L. Whearley,** executive vice president; **David W. Rea,** vice president and sales manager and **Allen C. Sheldon,** vice president, manufacturing.

To Handle Electrical Sales for L.O.F Glass Fibers

Stewart W. Schulmeyer has been named Sales Manager in charge of electrical sales for the **L.O.F Glass Fibers Company** according to an announcement by **C. F. Hegg,** Vice President and Sales Manager of the firm's Textile Division. He will make his headquarters at the general offices in Toledo.

★ ★ ★

In his new position, Mr. Schulmeyer will supervise sales of the company's glass textile yarns to the electrical trade, including manufacturers of electric motors, wires, cables and similar equipment. The yarn products are marketed under the tradename "Vitron" and are distributed nationally and in foreign countries.

★ ★ ★

Before his new appointment, Mr. Schulmeyer had been textile product sales manager for Glass Fibers Inc. which merged with the new L.O.F. Glass Fibers Company on March 1, 1955. He had also served in the project engineering,

MASON *lightweight, non-returnable, lithographed spools for:* **INSULATED WIRE · SOLDER WIRE THERMO-COUPLE WIRE · TV LEAD-IN WIRE AUTOMOTIVE CABLE**

BEST FOR LESS! That's what 175 leading manufacturers say about Mason Spool dependability and performance.

And they help you sell, too! Mason lithography (to meet your specifications) will always assure color uniformity and sharpness of detail for *instant brand identification.*

MASON lightweight, non-returnable spools are available in 5", 6½", 8½", and 10½" head sizes. All sizes are available with 1⅛" (Dia.) barrel. The 10½" head size is also available with a 3½" (Dia.) barrel. Barrel lengths from ⅛" to 14".

Tell us about your spool requirements NOW! We'll prove Mason Spools keep costs down—sales up! Telephone East Providence 1-2810 or write:

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Branch Plant — Greenville, Ohio

production and quality control departments of that company. Prior to joining the glass fiber industry, he had been project engineer on jet engines for the Aircraft Division of the Packard Motor Car Company.

Norton Appoints Representative in Washington

Machinery Associates, Inc. of Wynnewood, Pa., has been appointed exclusive representative in Washington, D. C., for the Grinding Machine Division of **Norton Company,** Worcester, Mass.

★ ★ ★

They will continue to represent Norton in the Philadelphia area. Under the new arrangement, they will handle both commercial and United States Government business in the Capital.

Peter K. Rylands

Peter Kirkland Rylands, eldest son of **Lieutenant Commander G. K. Rylands,** Managing Director of **Messrs. Rylands Brothers Limited,** Warrington, Eng., died suddenly on the 3rd of May. Aged 35, he was educated at Cranford and served an apprenticeship in the Merchant Navy in which he served during the last war. In 1946 he joined the Steel Works staff of the Lancashire Steel Corporation and in 1949 he transferred to the staff of Ryland Brothers Limited, where, at the time of his death, he occupied the position of Manager of the Wire Products Division.

Fuller F. Barnes

Fuller F. Barnes, 68, industrial and civic leader of Bristol, Conn., died June 18, 1955.

★ ★ ★

He was president of **Associated Spring Corporation** from the time of its organization in 1923 and chairman of the Board of Directors until his retirement in 1954. Associated Spring Corporation is the country's largest manufacturer of precision mechanical springs and spring steel products, with eleven operating divisions coast to coast and in Canada.

★ ★ ★

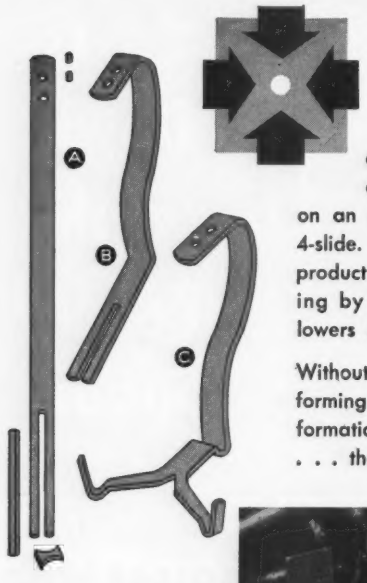
Mr. Barnes previously had been president of **The Wallace Barnes Co.,** Bristol, Conn., founded by his grandfather in 1857. Mr. Barnes and his brother, **Harry C. Barnes,** were chiefly instrumental in bringing together the three spring manufacturers, **The Wallace Barnes Co., William D. Gibson Co.** of Chicago and **Raymond Manufacturing Co.** of Corry, Pa., to form Associated Spring Corporation.

Beauford H. Reeves

Beauford H. Reeves, president of Rockbestos Products Corp., New Haven, Conn., died suddenly at his office recently, only a month after the death of his predecessor, Arthur G. Newton, the company's first and only other president.

★ ★ ★

Mr. Reeves had been elected president of this wire and cable company in March. He started with Rockbestos in 1923 as an engineer and was an important factor in helping the company achieve recognition as a leader in the manufacture of heat and flame resistant wires and cables. He was named vice president and general manager in 1936.



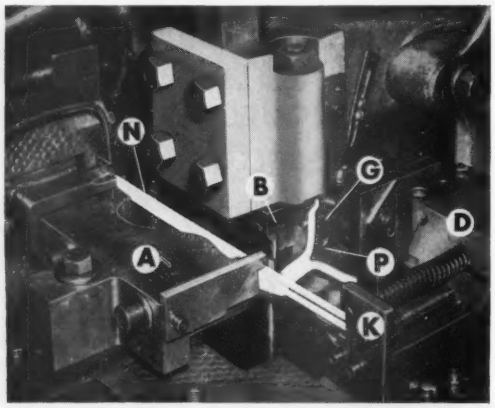
Stand is zinc-plated steel strip 0.05 in. thick by 0.625 in. wide . . . made in steps A, B and C.

Top performance in

MASS PRODUCTION

60 vaporizer stands per minute . . . automatically formed in one operation on an A. H. Nilson combination press and 4-slide. Kaz products are proof that clever product design, combined with precision tooling by Nilson, increases production and lowers costs.

Without obligation, Nilson provides specific forming recommendations from detailed information. Send for A. H. Nilson catalogue . . . the first step to increased production.



Final step in forming Kaz stands on Nilson 4-slide. Feet are spread, bent, crimped (G) with workpiece (P) on centerpost while next piece (N) is being cut off. Stop (K) on right slide (D) backs off after cut and workpiece (P) is wrapped around centerpost by die (A) when finished part is clear.

A.H. NILSON MACHINE COMPANY

1516 RAILROAD AVE. BRIDGEPORT 5, CONN.

A Review of Recent Wire Patents

The data listed below is only a brief review of recent patents pertinent to the readers and subscribers of this publication.

Complete copies of these patents may be obtained by writing to the publisher of this magazine and remitting 50¢ for each copy desired. For orders received from outside the United States the cost will be $1.00 per copy.

No. 2,709,985, SALT BRICK HOLDER FOR CAGES, patented June 7, 1955 by James H. Clauson, Tujunga, Calif.

The holder includes spaced-apart vertical and horizontal cage wires with the holder attached thereto.

★ ★ ★

No. 2,710,684, ANTI-DUMPING DEVICE FOR BUNDLES OF COILED WIRE, patented June 14, 1955 by George B. Hall, Concord, California.

This device is adapted for use with a roller conveyor having a sweep arm to move a wire bundle along the conveyor and a stabilizing arm which is adapted to move into and out of the core of the bundle upon different positions of the bundle.

★ ★ ★

No. 2,710,712, NAIL HANDLING APPARATUS, patented June 14, 1955 by John H. Friedman, Tiffin, Ohio, assignor to The National Machinery Company, Tiffin, Ohio, a corporation of Ohio.

More specifically, the invention relates to means to efficiently receive waste from the nail-receiving and discharge trough and discharge the waste into an adjacent chute.

★ ★ ★

No. Re/issue 24,026, VENTILATORS FOR HAY AND GRAIN CONTAINERS, patented June 21, 1955 by Clarence L. Wise, Springfield, Ohio.

An air conduit is disclosed consisting of a number of elements, each element being formed of a coil of wire, a sleeve in one end of each coil and the other end of each coil being threaded onto the sleeve end of another coil.

★ ★ ★

No. 2,711,007, MACHINE FOR WINDING WIRE INTO THE FORM OF STRAIGHT - SIDED POLYGONAL COILS, patented June 21, 1955 by Hans Peter Georgii, Stockholm, Sweden.

This machine is for bending and winding wire into the form of helical polygonal coils having straight sides and suitable for use as reinforcing elements in concrete piles and the like.

★ ★ ★

2,711,010, ELECTRODEPOSITION OF ANTIMONY, patented June 21, 1955 by Walter P. Karash, Cleveland, Ohio, assignor to The Harshaw Chemical Company, Cleveland, Ohio, a corporation of Ohio.

Upon a ferrous metal body is provided an adherent coating of lead with an inherent coating of antimony overlying the coating of lead and having been applied upon an unroughened surface of the lead coating. The antimony coating being fine grained and adherent and having occluded therein a trace of an aromatic sulfonamide containing a nitrogen atom carrying from 1 to 2 aromatic groups of the structural form RSO_2-, where R represents an aromatic radical containing 6 carbon atoms.

★ ★ ★

No. 2,711,026, WIRE MEASURING DEVICE, patented June 21, 1955 by Alden W. Nelson Pawtucket, and Sidney E. Borgeson, Cranston, R. I., assignors to The James L. Entwistle Co., Providence, R. I., a copartnership.

The device is so constructed that wires having various diameters may be measured for length and knots and the like in the wire will not affect operation of the device.

★ ☆ ☆

No. 2,711,337, DETACHABLE SELF-SUPPORTING BAIL HANDLE, patented June 21, 1955 by James F. Keenan, Ellicott City, Md.

The handle is of flexible wire with special attachment to a receptacle, as a pail.

★ ★ ★

No. 2,711,439, ELECTRICAL CABLES, patented June 21, 1955 by Esmond Wassell Smith, Beechcroft, Chislehurst, England, assignor to Canada Wire & Cable Company Limited, Leaside, Ontario, Canada, a company of Canada.

A high frequency coaxial communication cable is disclosed comprising a flexible inner conductor constituted by a central conductor core comprising a number of bare wires of a conductive

FROM—PLYMOUTH CORDAGE CO.
PLYMOUTH, MASSACHUSETTS
TO—THE WIRE INDUSTRY
Plymouth offers you PLYMKRAFT improved cable filler to your precise specifications. Made to fine tolerance, always uniform, this improved type of twisted paper is available in the exact put up that works best on your equipment, with any type treatment applied —wax, jute saturant, anthracene. Keep up to date on cable filler developments. For samples of PLYMKRAFT write to Plymouth, makers of fine cordage products for over 130 years.
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1824
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metal twisted together to form a composite strand of comparatively high tensile strength, and a single thin flexible metal conductive tape folded circumferentially around this core throughout its length with zero lapping lead longitudinally of the core and providing a flexible tubular high frequency conductor of comparatively low tensile strength free from joints extending around the core; and outer conductor; and insulation between the outer and inner conductors.

★ ★ ★

No. 2,711,577, METHOD OF MAKING ROLLED PLATE WIRE OF A CROSS SECTION OTHER THAN ROUND, patented June 28, 1955 by Philip F. Leach, Attleboro, Mass., assignor to Leach & Garner Company, a corporation of Massachusetts.

The method of forming wire of a cross section other than round with a plated top surface of precious metal is disclosed which comprises providing a bar of base metal generally rectangular in cross section, securing a thinner plating of precious metal on one side only on said bar, then while maintaining the plated surface flat, progressively rolling the bar lengthwise thereof on the side thereof opposite to the plated surface to form a plurality of deep grooves and simultaneously rolling shallower grooves on the plated side opposite the deep grooves until said grooves meet and a plurality of strips are formed.

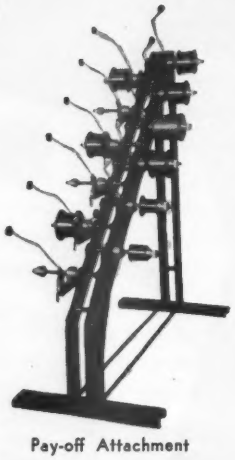
★ ★ ★

No. 2,711,832 COIL HANDLING DEVICE, patented June 28, 1955 by William B. Cigliano, Sterling, Ill., assignor to Russell, Burdsall & Ward Bolt and Nut Co., Port Chester, N. Y., a corporation of New York.

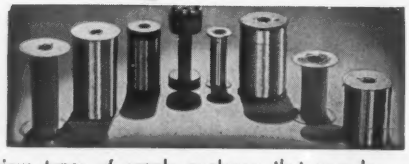
Cores of rod and wire are handled including a tiltable cradle having a coil receiving trough, which is piston operated. Special devices are provided to prevent jarring during operation.

STANDARD UNI-DRIVE WIRE WINDER

INCREASE YOUR PRODUCTION
WITH THIS WINDER



Pay-off Attachment



Wire Winder

Various types of supply packages that may be wound on Standard Uni-Drive Wire Winder.

PAYOFF

Our payoff attachment is made with self-aligning ball bearings and a compensating attachment to control the tension of each end. Applies same tension when spool is empty as when full.

The new Uni-Drive Winder with Payoff Attachment is new in design and incorporates several improved and tested features. Production is stepped up through increased speed. It produces smooth, even and accurately wound spools of wire in single or multiple ends. All strands parallel—no over or under-winding. Automatic Stop-Motion controls each strand. Compensating attachment produces perfectly controlled tension. Traverse adjustable from 1¾" to 5½" between spool heads without changing cam. Designed especially for winding wire to be braided and shielded for electrical conductors up to ¾" diameter.
Payoff can be equipped with Carboloy Guide Inserts at additional cost.

STANDARD MILL SUPPLY COMPANY
PAWTUCKET, RHODE ISLAND, U.S.A.
1064-1080 Main St.
PAwtucket 3-1534 — 3-1535 — 3-1536

New Directory of Consulting Services

The 15th edition of "CONSULTING SERVICES" (1955) published by the **Association of Consulting Chemists and Chemical Engineers, Inc.,** is off the press.

★ ★ ★

Revised and streamlined, it now appears in a new format, 6 x 9, for easy handling. It contains 144 pages of valuable information.

★ ★ ★

Table of Contents, Foreword and a page entitled "How To Find Your Consultant" precede three sections as follows:

Section I. CLASSIFIER. This section contains over 200 items of activity, with the members specializing or qualifying in the given field indicated by key numbers.

Section II. SCOPE PAGES. These describe page by page each member's qualifications and activities.

Section III. INDEX. (a) Alphabetically by members; (b) by geographical location, including branch offices.

★ ★ ★

Send letterhead requests with remittance of $1.00 per copy to the Association, 50 East 41st St., New York 17, giving sources of reference, name of person and company, and complete address including postal zone number.

Nickel Supply May Improve

Government stockpiling and defence requirements accounted for some 40 per cent of the total free world supply of nickel in 1954, **Dr. John F. Thompson,** Chairman of the Board of Directors of **The International Nickel Company of Canada, Limited,** told shareholders at the company's annual meeting recently.

★ ★ ★

With total free world supply at a record 390,000,000 pounds, and less demand upon industry for de-

fence production, Dr. Thompson said, "the supply of nickel for civilian applications was improved, even though complete satisfaction of all civilian requirements was not possible."

★ ★ ★

Free world production capacity for nickel is expected to increase by 1958 to at least 450,000,000 pounds. "The increase in International Nickel's annual productive capacity since the year prior to Korea," he stated, "has amounted to over 40,000,000 pounds. Its deliveries of nickel in all forms in 1954 set a record at 282,000,000 pounds."

★ ★ ★

Noting that stockpiling and defence purposes accounted for some 40 per cent of the total free world supply of nickel, Dr. Thompson said that while stockpiling is expected to continue, there are indications that the scheduled intake for this purpose may be modified after defence requirements have been satisfied and more nickel will be available this year for civilian applications than in 1954. The company's management feels that adequate defence preparedness is impossible without a healthy nickel-consuming civilian industry. Many manufacturers have been endeavoring to eliminate nickel in their products. This situation could have consequences detrimental to security, as in times of national emergency it is necessary both to possess the required strategic materials and to have the trained manpower, technical knowledge and facilities to use them.

New Attachment Increases Utility of Die Honing Machine

A new attachment consisting of a flexible rod with ball joint diamond file on the end, has been added to the Nord Di Profiler Die Filing Machine. It is mounted to provide reciprocating action adjustable from 0" to ¼" and the ball joint action permits the abrasive face to conform to any contour for which it is designed.

★ ★ ★

Commonly used for honing and finishing cavities of molds and dies as well as forms and precision contoured pieces that can't well be reached by normal file or finger action, this extension attachment is particularly valuable for tool and die makers, mold makers, manufacturing jewelers, precision, instrument and gage manufacturers.

★ ★ ★

Complete details will be gladly furnished upon application to Nord International Corp., 449 W. Central Ave., Orange, N. J.

Hose Clamp Used for Seizing Wire Rope

A quicker, tighter seize for cutting wire rope can be obtained using Punch-Lok hose clamps manufactured by the **Punch-Lok Company**, 321 N. Justine St., Chicago 7, Illinois. Cutting wire rope without first seizing it securely, can

When wrapping your wire or rod

...REMEMBER

It's the **Crinkle** in the PAPER that COUNTS!

For a tighter, more compact wrap, specify—
"Arksafe" CRINKLED KRAFT WIRE WRAP

Easy to handle, simple to apply. Uniform crepe—Strong and *Economical*, too!

CONSTRUCTION: Single ply, waxed, asphalt laminated and reinforced.

In Standard Rolls and Widths for use on all types of wrapping machines. Also available in Hand Rolls.

For details, write Department WP-1.

ARKELL SAFETY BAG COMPANY
10 EAST 40th STREET (Established 1896) 6345 WEST 65th STREET
NEW YORK 16, N. Y. CHICAGO 38, ILLINOIS
Plants: Chicago, Illinois, and Newport News, Virginia

throw it out of fabricated position and result in kinks or doglegs.

★ ★ ★

Seizing with hose clamps prevents any movement of the strands during cutting operation. On stress-free preformed rope only one clamp is needed on each side of the cut. Clamps can then be removed or left as a permanent seize if needed.

ASTM Standards on Rubber, Plastics and Electrical Insulation

This new publication, the 1954 supplement to the Book of ASTM Standards, including tentatives, covers:

Sample preparation for physical testing of rubber products.

Natural rubber for wire and cable insulation.

Chemical analysis of rubber products.

Natural rubber heat resisting insulation.

Testing thermoplastic insulated cable.

Heat aging of rubber.

Construction of rubber insulated wire and cable.

Specifications for polyethylene insulated wire.

Butyl rubber insulation for wire.

Electric insulating oils.

Tests for varnished cloths and tapes.

Electrical insulating paper.

Silicone insulating varnishes.

Definitions of plastic terms.

And many other subjects.

★ ★ ★

For copies of this book, write to the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Prices quoted upon application.

New Aluminum Rod Rolling Mill Placed in Operation

The Aluminum Industries, Ltd., Kundara, India, devoted two days, May 11 and 12, 1955, to exhibiting to guests their new aluminum rod rolling mill that was placed in operation on May 12. Visitors were welcomed by **Sri. V. G. G. Nayar,** and the mill was started by the **Hon. Sri. Panampalli N Govinda Menon,** Chief Minister, I.-C. State.

Reid-Avery Adding Equipment

In line with its policy of top quality at low cost, and to meet the increased demand for all types of automatic wire, **Reid-Avery Company,** Dundalk, Md., is in the process of installing three new coiling machines of its own design, a new continuous electrolytic copper plating machine, a new Trauwood continuous annealing line and is modernizing parts of the wire drawing facilities, which now include the most modern Vaughn continuous 6-pass machines.

★ ★ ★

The above equipment is expected to materially increase the production of all types of alloy and specialty wires in addition to the low alloy and mild steel grades of rewound coils for automatic welding.

Patenting Steel Wire

One of the problems in the patenting heat treatment of steel is keeping the surface bright, free from scale, smut and adhering lead.

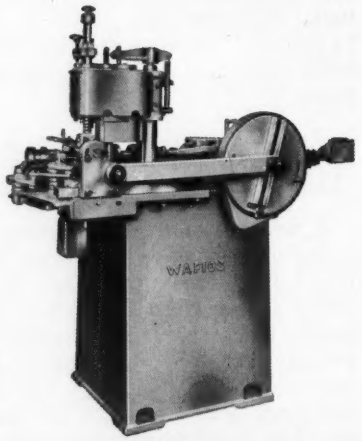
AUTOMATICS

FOR THE WIRE TRADE

AUTOMATIC TORSION SPRING COILING MACHINE

Model SFM, 4 different sizes

Wire Range: .008—.315"



Sole Agents for the U.S.A.
Kurt Orban Co., Inc.
34 Exchange Place,
Jersey City 2, N. J.

WAFIOS MASCHINENFABRIK REUTLINGEN 3 / GERMANY

Practically every wire mill uses lead baths.

★ ★ ★

In order to reduce oxidation of the lead and make it unnecessary to dross the bath at frequent intervals, a molten salt bath material—**Liquid Heat 636**—is recommended as a covering for the lead bath.

★ ★ ★

The use of Liquid Heat 636 facilitates heat treating, leaving a bright surface free from all particles of picked up lead which could cause difficulties in succeeding operations.

★ ★ ★

One large steel company has been using Liquid Heat 636 as a covering on their lead patenting bath for over one year.

★ ★ ★

The wire is run through an air furnace held at 1700° and quenched in a lead pot at 1075-1125°F. Then it is washed with water and wound on reels.

Every 24 hours, 75 tons of wire are processed. Between 28 and 36 strands run through the pot at one time.

★ ★ ★

The speed of the wire depends on its size; .210″ wire is run at 11 feet per minute, .262″ wire at 9 feet per minute.

★ ★ ★

Lead pots are 40 feet long, and covered with half-inch layer of molten salt. Sinkers 6 feet from each end hold the salt in place and hold the wire down in the lead. Salt at the entrance end of the pot is kept liquid. Between the sinkers an insulating layer of conventional lead pot cover is added, blanketing the salt and reducing heat losses.

★ ★ ★

Salt is added at the entrance end of the lead pot as needed. The operator keeps between ¼″ and ½″ of salt over lead at all times.

★ ★ ★

A crust is formed in the center section of the pot which acts as an insulator. Floating dams are anchored on the pot at both ends 6 feet from the end. The salt is up to ½″ deep between the dams and 1″ of lead pot covering is floated on top of the salt. No salt is used at the exit end.

★ ★ ★

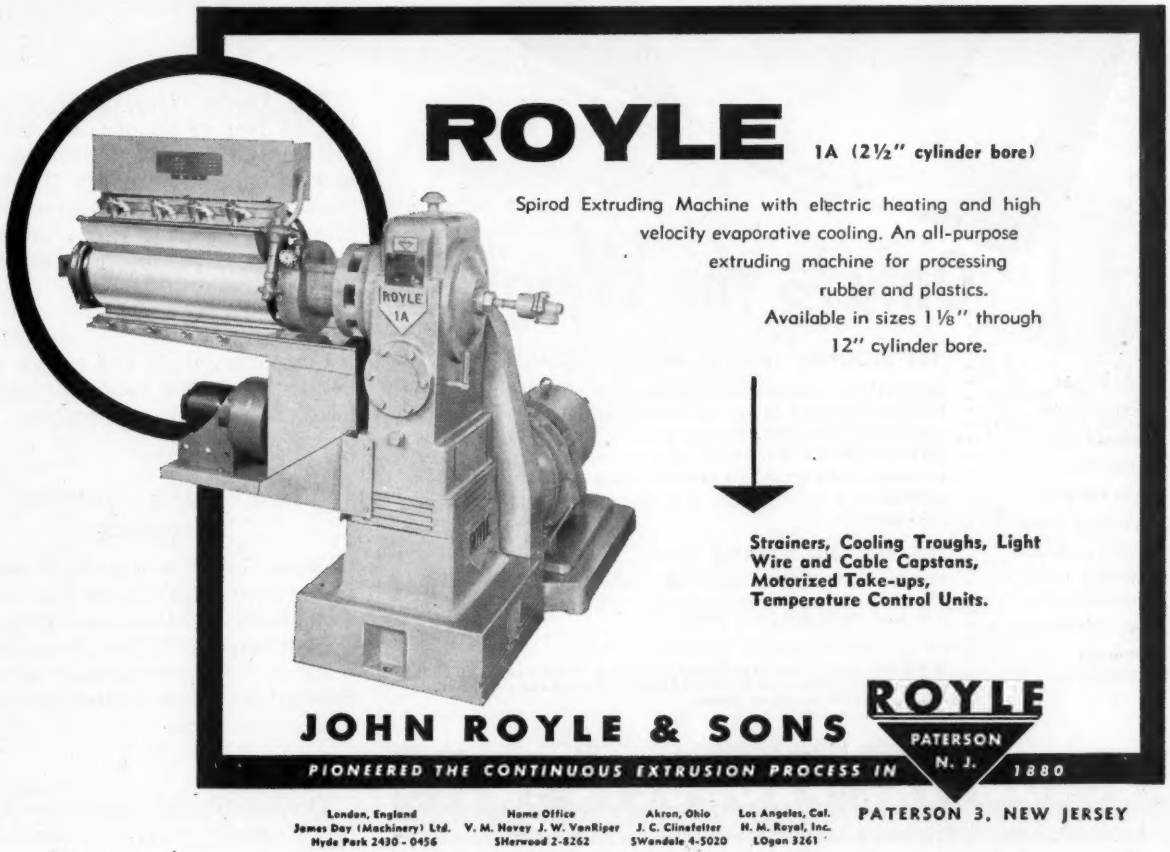
In one year's operation the cost of the salt has been largely offset by saving in lead consumption, although this was not the original reason for using it. The major consideration was the bright surface of the patented wire free from scale, smut and adhering lead particles.

★ ★ ★

For further information, write to **E. F. Houghton & Co.**, 3rd and Lehigh Sts., Philadelphia 33, Pa.

New Mill Flooring Material

Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn., has developed a new


ROYLE
1A (2½" cylinder bore)
Spirod Extruding Machine with electric heating and high velocity evaporative cooling. An all-purpose extruding machine for processing rubber and plastics.
Available in sizes 1⅛" through 12" cylinder bore.
ROYLE
1A
Strainers, Cooling Troughs, Light Wire and Cable Capstans, Motorized Take-ups, Temperature Control Units.
JOHN ROYLE & SONS
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PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN
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PATERSON 3, NEW JERSEY

concrete-type industrial flooring and construction material that "gives" without cracking under heavy loads, dampens shock and noise, resists alkalies and mild acids, is waterproof and has a non-slip quality.

★ ★ ★

The material is a combination of liquid rubber and a special cement powder and is called Laticrete. The rubber content makes it so flexible when hard that a long, thin slab can be bent into a circle by hand. The rubber also gives the cured mix "bounce" and a tight bond that makes it resist breakdown under heavy use. Test patches in plants show virtually no wear after two years of high-volume traffic.

★ ★ ★

The new surface coating can be used for repair work or in new installations. It has good adhesion to concrete, metal and even glass. A quarter-inch layer, the suggested thickness, will support heavy loads such as fork lift trucks when put down over a hard base.

Standardize on ACROPAK* Spools!

Only ½ the Weight!

YET STRONG, TOUGH, RIGID . . *LONGER LIFE*

ACROPAK Spools will help you cut wire packaging costs because they give longer service, require less maintenance and cost less to ship. They're strong. They'll take repeated shippings and still run true on the arbor. They're machined to close tolerances. You can run them at high production speeds with fewer snags, less toe-out and minimum end breakage.

THEY CUT YOUR SPOOLING COSTS

Best proof of ACROPAK superior performance are the millions of these spools now used by the biggest names in the wire industry. We've proved it to them—let us prove it to YOU.

- Light Weight
- Precision built
- Reduced cost
- Longer life
- Extra strength
- Dynamic balance
- Greater production
- Low cost reconditioning
- Less maintenance
- Attractive packaging

★ We also make a complete line of heavy-duty shop processing STEEL SPOOLS built to the same high standards of accuracy and rigidity as the famous Acropak aluminum spools.

ACROMETAL PRODUCTS INC.
Division U S Bobbin and Shuttle Co., 616 Fifth Street N., Minneapolis 1, Minn.

New Automatic Welding Fixture

The Lewis Welding & Engineering Corp., 71 Interstate St., Bedford, Ohio, announces the development and availability of a new universal fixture designed to handle a wide variety of weldments. Exclusive features of this unit include full portability, simultaneous 3-directional travel, 360° boom rotation and an adjustable base. In addition, any standard head can be utilized with this fixture for automatic welding, flame cutting or hardening operations.

★ ★ ★

Because of its unique adjustable base, the Lewis "Universal" welder reduces normal set-up time, particularly for large weldments, as much as 60%. Precise alignment for longitudinal and transverse welds is accomplished rapidly and easily by means of an adjusting wheel at one end of base. Once set-up is completed, unit is operated by remote pushbutton controls that permit simultaneous 3-directional travel. Speed of operation is infinitely variable and ranges up to 72 inches of travel per minute.

★ ★ ★

The Lewis "Universal" welder has 18 feet of longitudinal travel and can be furnished with booms and columns of various lengths. Transverse travel of boom and clearance under it range from 8 to 12 feet, depending upon size of unit.

★ ★ ★

Complete details and prices will be furnished upon receipt of letterhead request or publication inquiry.

New Portable Cord Line Announced

A complete line of portable cords for rugged applications has been announced by **Anaconda Wire & Cable Company** 25 Broadway, New York 4, N. Y. It includes a new Securityflex cord, Industrial cord and Service cord.

★ ★ ★

The Securityflex cord is designed for unusually severe applications,

where cords are exposed to the elements and subjected to abrasion, crushing, impact, shock, moisture, oils, grease and acids. It is especially adapted to industrial application and meets the requirements of the Federal Bureau of Mines and Pennsylvania Department of Mines for use in mines.

★ ★ ★

For severe applications, the new Anaconda Industrial cord combines serviceability and economy. It resembles the Securityflex cord in all respects, except that the neoprene jacket is cured by continuous vulcanizing. The jacket is free stripping and can be used in automatic stripping machines.

★ ★ ★

The Service cord is designed for hard service use—where normal mechanical damage and dampness are encountered and exceptional flexibility is needed. Typical uses are on appliances, office equipment, portable tools, and trouble lights.

★ ★ ★

A descriptive catalog, Anaconda Portable Cords, is available upon request.

Gets C.F.&I. Furnace Contract

The Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation have awarded a contract to **The Gas Machinery Company,** Cleveland, Ohio, to furnish a 60 ton billet heating furnace for their River Road plant in Buffalo, N. Y.

Cable Jacket Still Good after 20 Years in the Sun

In January 1935—more than 20 years ago—two samples of cable were put in the Okonite Company's outdoor proving ground at Passaic, N. J. One had a natural rubber jacket, the other a neoprene jacket. The word Duprene, which appears on the identification tag, is the old tradename under which Du Pont sold neoprene from 1932 until 1936.

★ ★ ★

After 20 years in sun and weather the neoprene is still lively and tough. No cracks have appeared, and the jacket is doing its job, which is to protect the underlying insulation.

★ ★ ★

The natural rubber jacket is badly deteriorated. The jacket has almost no physical strength and there are many cracks.

★ ★ ★

The samples are bent to stress the jacket. Application of stress is a standard method of accelerating the oxidation process in rubber and it is oxidation that causes rubber to crack, weaken and lose elasticity. Neoprene's resistance to this kind of deterioration is inherent in the polymer.

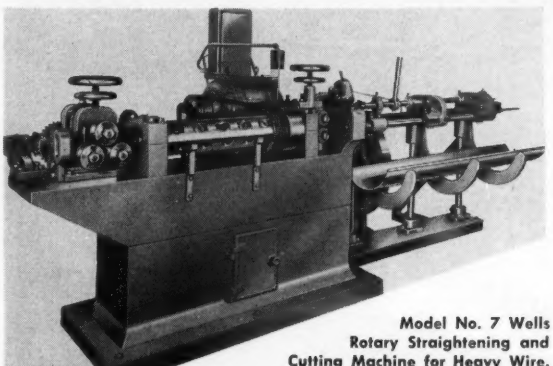
★ ★ ★

It would be interesting to measure the physical properties of the neoprene and natural rubber jackets, but that would destroy the samples and these are the last of their kind. However, physical tests were run ten years ago on small pieces cut from the ends of the samples, and at that time the natural rubber jacket was so deteriorated that tensile strength and ultimate elongation could not be

A Fast, Dependable Wells

STRAIGHTENER AND CUTTER FOR HEAVY WIRE

Shown below is the famous Model No. 7 WELLS ROTARY STRAIGHTENING AND CUTTING MACHINE designed for a maximum of durability and service.



Model No. 7 Wells Rotary Straightening and Cutting Machine for Heavy Wire.

Flyer runs in ball bearings. All wear parts made of tough steel for long, trouble-free operation.

Motor and gears are readily accessible through door in base.

A highly satisfactory machine for day-in, day-out production.

This machine is designed to handle 1/4", 5/16", 3/8", 7/16" and 1/2" wire at speeds of 90' to 100' on long continuous production runs. Other WELLS MACHINES are made to handle smaller gauges of wire at correspondingly higher speeds.

Backed by 59 years of experience and development

Send for Catalog covering the full line.

Frank L. Wells Company

KENOSHA • 5821 Fifth Avenue • WISCONSIN

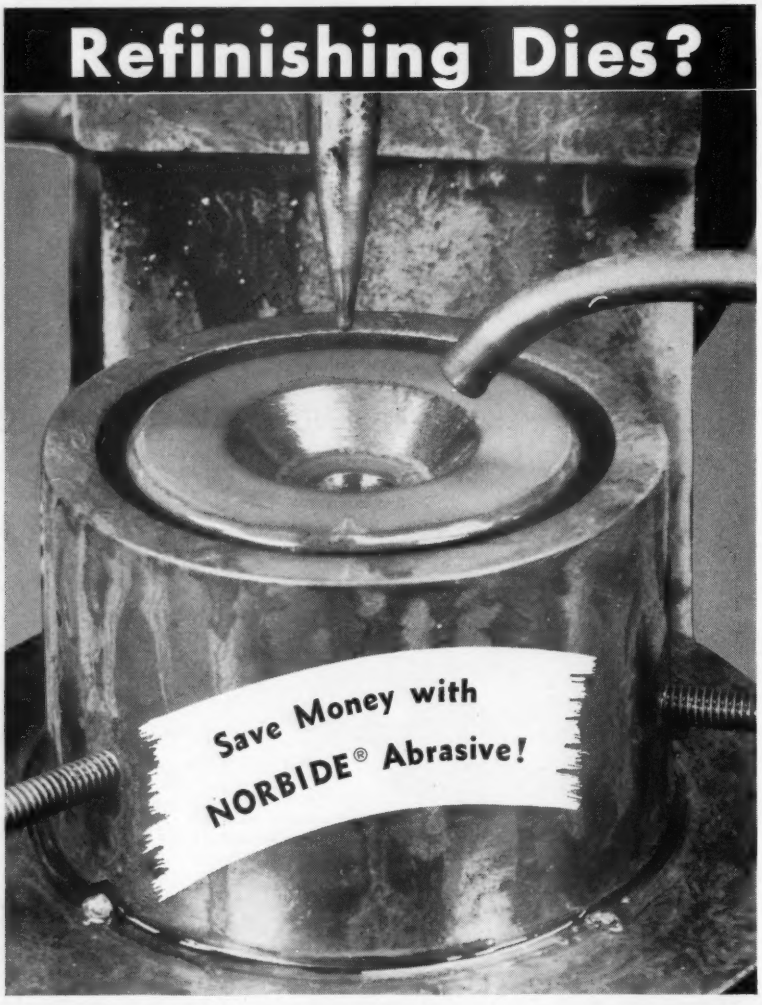
Builders of Fine Wire Working Machinery

measured. Neoprene jackets after 10 years exposure had retained 72 per cent of original tensile strength and 85 per cent of original ultimate elongation. Moreover, the neoprene deterioration curves were flattening out, so the neoprene jacket has probably lost even less in the second 10 years of exposure. Judging from feel and appearance it couldn't have deteriorated much.

★ ★ ★

Validity of the test is borne out by industry's acceptance of neoprene jacketed wire and cable. It is the standard of excellence for outdoor installation. It is made by all the large wire manufacturers and used by almost all public utilities for jacketing weatherproof wire and aerial cable. One kind of wire, telephone drop wire, consumes more neoprene than any other end-use. More than 40 million pounds of neoprene a year are used to cover wire and cable—of which almost half is used in outdoor service. Most of the other half goes underground.

★ ★ ★



You may never use a wire drawing die this large, but no matter what size dies you're refinishing, you can save money by using NORBIDE Abrasive — rather than costly diamond dust — for ripping or fast stock removal as well as for accurate semi-finishing operations. For details, write for Form 559.

NORTON
BORON CARBIDE

NORTON COMPANY
New Bond Street
Worcester 6, Mass.

To engineers who tend to think of neoprene as an oil resistant rubber, it usually comes as a surprise to learn that resistance to sun and weather "sells" at least as much neoprene as resistance to oil.

British Patent Publication

The Technical Information Company, Newton House, Mount St., Liverpool 1, Eng., began the publication in January of a weekly periodical called the "Patents Abstracts Journal".

★ ★ ★

Patents are grouped into three classifications: General and Mechanical, Chemical, and Electrical. Subscription to the three groups costs $95.00 per year while the separate groups cost $60.00 each, if ordered separately.

★ ★ ★

Each abstract gives the patent number, the applicant's name, priority dates and country of origin, besides a brief description of the patent.

Vapor Plating

The above is the title of a new book sponsored by the Electrochemical Society, published in June by **John Wiley and Sons, Inc.,** 440 Fourth Ave., New York 16, N. Y.

★ ★ ★

"Vapor Plating" is a term that applies to both a physical and a chemical process of the depositing of pure metals, carbides, nitrides, borides, silicides and oxides. This book is concerned with the latter process only, in which these substances are deposited from gaseous mixtures of their vaporized compounds.

★ ★ ★

It is a critical and authoritative review of the applications and techniques of chemical vapor plating, by which refractory metal and refractory compound coatings may be applied in thickness of a few hundredths of a mil to a quarter of an inch or more. Massive deposits can be formed on filaments of fine wire in a relatively short time.

★ ★ ★

The several chapters treat of the various substances used for vapor plating. In the metals group are

those like copper, beryllium, aluminum, titanium, tin, vanadium, chromium, tungsten, nickel and many others. While the process is not new, and, for some metals is in the development stage, vapor deposition is growing in use, especially for high temperature applications.

★ ★ ★

The book was written by **C. F. Powell,** I. E. Campbell, and Bruce W. Gonser of the Battelle Memorial Institute. It contains 158 pages of text and sells for $5.50.

Bolts Replace Rivets In Assembly of New York Building

A new milestone in construction has been reached with the recent completion of steelwork for New York's first building erected with high strength bolts.

★ ★ ★

The noise of riveting long associated with skyscraper building was absent as the skeleton of the 18-story apartment building took final shape. Thirty-five thousand fasteners, supplied by **Russell, Burdsall & Ward Bolt & Nut Company,** Port Chester, N. Y., were used in the structural assembly, which was completed in less than three months, several weeks faster than conventional construction would have been. "Fabricated joints using high strength bolts have proven fatigue strength at least 20% higher than those using rivets," according to **John S. Davey,** R. B. & W. vice president. "Fabricators report significant savings in erection which they translate into joining costs only 60% their estimate for rivets."

★ ★ ★

The new building is located at 35 Park Avenue on the southeast corner of 36th Street, in the Murray Hill district.

★ ★ ★

Use of bolts on the building was approved by New York City's Department of Housing and Building. Amendments to the city's building code to permit more widespread application of the high strength bolts are now pending.

★ ★ ★

Relatively new to structural assembly, the high-tensile steel bolts are a result of extensive research on fabricated joints. They meet ASTM Specification A325-53 T; their application has been approved by American Institute of Steel Construction and Research Council on Riveted and Bolted Structural Joints.

New Instruction Bulletin on Dip Coating with Chem-O-Sols

Chemical Products Corporation, East Providence, R. I., has just issued a new instruction bulletin telling how to dip coat and improve products with **chem-o-sol,** a plastisol formulation. The bulletin is largely technical, giving temperatures and heating periods for sample applications. Also included is a discussion of dip coating **chem-o-sols** with and without pre-heating.

★ ★ ★

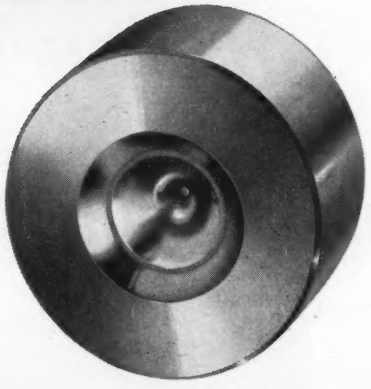
Write for Bulletin No. 1 to: Chemical Products Corp., King Philip Road, East Providence, R. I.

Simplex Wire Enlarging Plant

Simplex Wire & Cable Co. Cambridge, Mass., is now building a 100,000-sq.ft. addition to its Newington, N. H., plant, that is estimated will cost $1,000,000. The building is the second added since the plant opened in October, 1953. Increased orders for submarine cable, including wire for the new transatlantic telephone cable to be laid this summer, has made the expansion necessary.

WILLEY'S
TUNGSTEN CARBIDE

METALS
DIES
TOOLS
for the Wire Industry



Rough Cored Standard Dies
(from stock)

ROUND SQUARE HEXAGON OCTAGON

Rough Cored or Finish Ground
(Immediate quotations on receipt of your prints—
Fast delivery schedules)

SPECIAL DIES WEAR PARTS MANDRILS
NIBS—HEADING AND EXTRUSION DIES

For complete information:

Willey's Carbide Tool Co.
1340 W. VERNOR HWY. • DETROIT 1, MICHIGAN

Improved Workability Offered In New Stainless Wire

A new Type 302 stainless steel wire with a more restricted analysis range has been developed by the **Webb Wire Division of The Carpenter Steel Company,** New Brunswick, N. J.

★ ★ ★

The new wire analysis, known as Blue Label Stainless, is a premium quality wire designed primarily for use in the production of springs. It is suitable as well for all other types of wire forms.

★ ★ ★

Restricting the analysis range is reported to have improved the alloy's corrosion resistance, coiling properties and ability to take sharp bends. Uniformity of temper from coil to coil is also said to be vastly improved.

★ ★ ★

Extensive tests conducted during the wire's development indicate unusually strong fatigue life in springs. Cost is similar to that of the standard Type 302 stainless wire.

Advertise your Wire in
WIRE AND WIRE PRODUCTS
Send for rates

New Plant in South for Scott Testers

Scott Testers (Southern), Inc., the southern repair and service center for equipment manufactured by Scott Testers, has erected a new plant in Spartanburg, S. C.

★ ★ ★

Parts will be stocked, and a staff of factory-trained service personnel will be available for repair work. **John E. Hargreaves** will serve as general manager of the Spartanburg plant.

New Cable Eccentricity Gauge

An improved Cable Eccentricity Gauge has been added to their range of Eccentricity and Size Control Equipments for extruded wires and cables by the **Addison Electric Co. Ltd.,** Bosworth Road, London, W.10.

★ ★ ★

This new model is based on a capacitive method. Two self-aligning electrode arms lightly touch the cable under test, and eccentricity is indicated by a moving coil meter. The latter is calibrated directly in percent eccentricity. The meter has full scale deflections of ± 25% with a centre zero, allowing a readability to about 0.5% eccentricity, referred to the wall thickness of the dielectric.

★ ★ ★

As opposed to the earlier Model 155, which operates on an inductive principle, there is no need for the injection of a pilot current into the cable under test; the latter has, however, to be dry while being measured. Two units may, if required, be employed with their electrode arms at right angles; extension motors, and recording facilities are available, similar to those used with Addison Size Controllers.

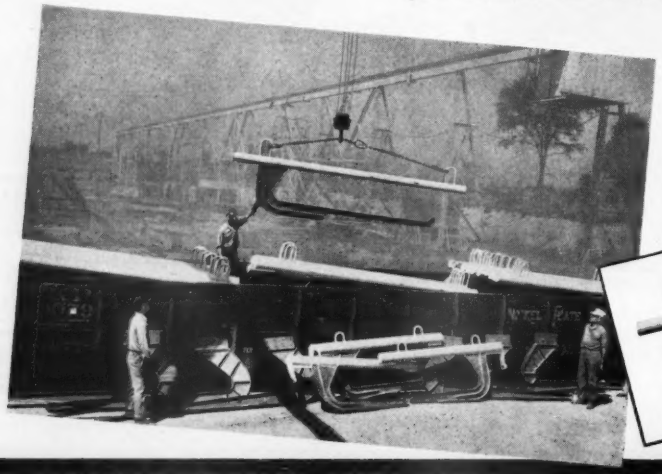
WELDCO

LIGHTWEIGHT HAIRPIN HOOKS

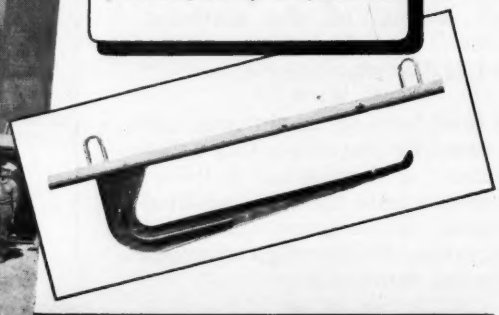
For Long, Heavy-Duty Service

In plants and wire mills everywhere, WELDCO Lightweight Hooks are replacing heavy, old-style hooks. For WELDCO Hooks are stronger, lighter in weight, easier to handle, more corrosion-resistant, carry heavier loads (up to 6,000 lbs.) easily and safely. And WELDCO Hooks are built for long, economical service . . . outlast heavy cast hooks 2 to 3 times.

Whether you need conventional pickling hooks or special adaptations, WELDCO engineers design and build to your exact specifications. For complete information and free literature, get in touch with us today.



Corrosion-Resistant . . .
Handle Loads up to 6,000 lbs!



THE YOUNGSTOWN WELDING & ENGINEERING COMPANY
3801 OAKWOOD AVENUE · · · YOUNGSTOWN 9, OHIO

New Manual for Stainless Wire Users

Crucible Steel Company of America, Pittsburgh, Pa., announces the availability of a new 32-page manual containing pertinent data to aid users of fine wires in selecting the proper stainless steel wire to meet their particular specifications. Entitled Rezistal (R) Stainless Steel Wire, the booklet discusses the three group classifications of Rezistal stainless steel (Austenitic, Ferritic, and Martensitic), gives common uses of the wire and lists typical end products manufactured from the wire.

★ ★ ★

The booklet features numerous tables giving size range and straightened lengths of the product, coil data, chemical analysis and characteristics, physical properties in the annealed condition, and mechanical properties for cold drawn wire. Also featured in the manual are tables listing size ranges and straightened cut lengths for Crucible's stainless steel shape wire, including squares, hexagons, octagons, flats, and special shapes; minimum and maximum tensile strength of Rezistal spring wire; and laboratory corrosion data showing loss conversion and resistance to corroding media of four of the most important grades of the wire.

★ ★ ★

The booklet also includes data on finishes and weights of the product and types of spools used for the fine wire along with other information of interest.

★ ★ ★

For a copy of the booklet, write to the advertising department, Crucible Steel Company of America, P.O. Box 88, Pittsburgh 30, Pa.

New Booklet on Automatic Control of Variable Speeds

"Automation Through Varitrol Control," is the subject of a new full-color 8-page booklet. Multicolor cross-sections and diaphanous views show how an improved pneumatic control called Varitrol has been designed into U. S. Varidrive Motors to increase and improve output of a customer's product, reduce waste, save time and man power.

★ ★ ★

Typical automatic control applications are shown. Schematic drawings explaining the process are shown with each application.

★ ★ ★

The booklet points out that U. S. Varidrive Motors with Varitrol control are now available from 1 to 60 h.p. with speeds from 14 to 14,000 rpm. Integral gearing for low speeds, totally-enclosed or explosion-proof motors are also available.

★ ★ ★

For a copy of this informative bulletin, write U. S. Electrical Motors Inc., Box 2058, Los Angeles 54, California, requesting Bulletin 1882.

WHAT MEMBERSHIP IN THE WIRE ASSOCIATION OFFERS YOU:

1. **WIRE & WIRE PRODUCTS**—For One Year. The official publication of The Wire Association, covering The Wire Industry; its Metallurgy, Technology, Research, Processes, Machinery and Personnel.
2. **THE ANNUAL BUYERS GUIDE & YEAR BOOK OF THE WIRE ASSOCIATION.** The Year Book Section contains: Constitution and By-Laws of The Wire Association; Details of year's meetings, etc.; List of Members, Index to Papers and Articles in WIRE & WIRE PRODUCTS.
3. **QUESTION AND ANSWER SERVICE.** Answers to technical and operating problems direct by mail. Available to members only.
4. **ANNUAL CONVENTION.** Technical sessions covering metallurgical and manufacturing problems involved in the production of ferrous and non-ferrous wire, electric wire and cable and other products fabricated either wholly or in part from wire. Plant inspections.
5. **REGIONAL MEETINGS.** Attendance at the regional meetings which include Local Plant Inspections, Technical Sessions and Discussions.
6. **PERSONAL CONTACTS.** Both at Annual and Regional Meetings, and throughout the year, for interchange of helpful information.
7. **INFORMATION SERVICE ON MACHINERY, EQUIPMENT AND SUPPLIES.** The Technical, Catalogue and Correspondence Files of the Wire Association hold the answer to practically every "Where can I buy" problem. This service is available to members without charge.

ANNUAL DUES: $15.00

For booklet giving detailed information and a membership application card, address

RICHARD E. BROWN, Executive Secretary

453 Main Street • **Stamford, Conn.**

Astm Organizes Committee on Electronics Materials

A new committee on electronics materials was authorized by the Directors of the **American Society for Testing Materials** in May to cover the field of materials for electron tubes and semiconductor devices.

★ ★ ★

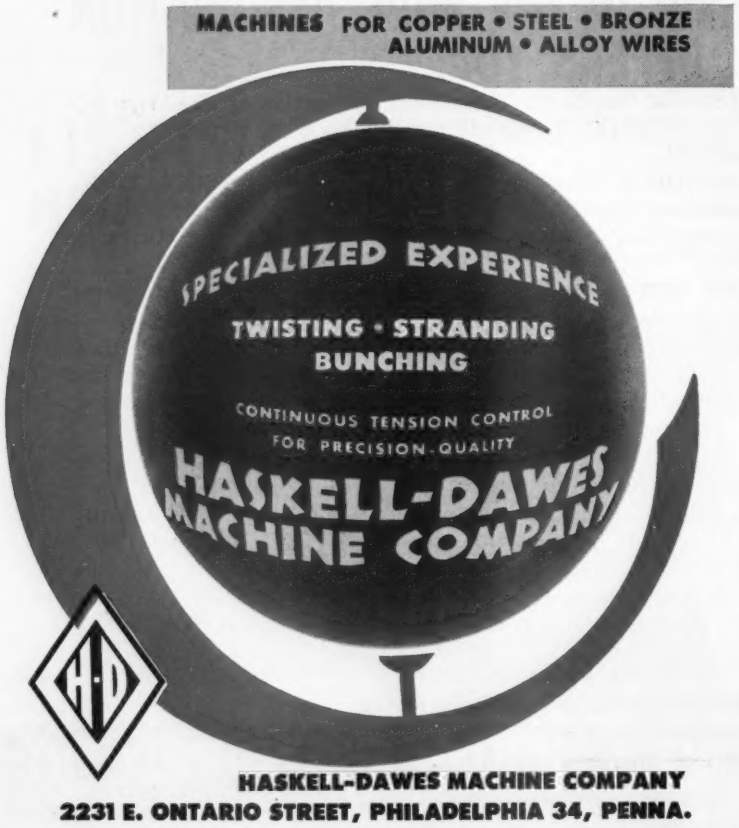
The new committee, designated F-1 on Materials for Electron Tubes and Semiconductor Devices, will be concerned with materials for electron tubes such as grid wires, cathodes, mica stampings, glass-to-metal seals and luminescent materials used in cathode ray tubes and in fluorescent lighting. In view of its concern with many different materials, the new committee will be working closely with several other technical committees of the Society.

★ ★ ★

The new committee was created from a nucleus consisting of Subcommittee VIII on Metallic Materials for Radio Tubes and Incandescent Lamps of Committee B-4 on Metals for Electrical Heating, Electrical Resistance, and Electronic Applications, which had for some time carried out considerable research and developed a number of standards on materials for electron tubes. Committee B-4 on Metallic Materials for Electrical Heating, Electrical Resistance, and Electrical Contacts will continue with a reduced scope.

★ ★ ★

It is expected that an "F" series of committees will develop as the sixth series of ASTM technical committees taking their place beside the well-established groups on Ferrous Metals ("A" series), Non-Ferrous Metals ("B" series), Ceramic and Masonry ("C" series), Miscellaneous Materials ("D" series), and Miscellaneous Subjects ("E" series).



Westinghouse Purifies Titanium by Zone Refining

Scientists at the **Westinghouse Research Laboratories** are purifying titanium and other hard-to-get metals by imprisoning the molten metal inside a cage of its own making. The process, called cage zone refining, uses a unique method to melt a bar of metal while the metal acts as its own crucible, thus preventing contamination by any containing vessel. Object of the process is to prepare super-pure metals.

★ ★ ★

The new technique was developed by **P. H. Brace,** consulting metallurgist; **Dr. A. W. Cochardt** of the metallurgy department; and **Dr. George Comenetz,** advisory engineer to the metallurgical consulting staff of the Laboratories.

★ ★ ★

Zone refining, in which a bar is melted progressively from one end to the other, has become a standard process for purifying certain metals. In transistor research at the Laboratories, for example, it is used routinely to prepare germanium metal having impurities of about one part in 10,000,000,000. The new technique applies this valuable refining process to metals which are so active at high temperatures that they react with any crucible in which we could heat them.

Nichols Wire Puts Out Aluminum Trellis

An aluminum trellis that can cover an arbor or be mounted directly on a house is now being distributed by **Nichols Wire & Aluminum Cmpany** of Davenport, Ia., through hardware stores, lumber yards, nurseries and other outlets. It comes in 25 foot lengths.

★ ★ ★

A soft, silver-like finish makes the trellis attractive, tension bars supplied with it make it easy to install, and the chain-link weave makes shortening or lengthening a two-minute operation, requiring only pliers.

★ ★ ★

The Nichols trellis has a uniform width of two feet, rather than the V-shape of many trellises now on the market. Since aluminum reflects up to 95% of heat, the new trellis will not burn a plant's tendrils.

New Wire Speeds Bobby Pin Production

Each year 10,000 tons of steel wire are made into bobby pins.

★ ★ ★

To aid bobby pin manufacture, The Worcester Wire Division of **The National-Standard Company,** Worcester, Mass., developed a highly refined steel with a finish sufficiently uniform to stabilize pin processing and eliminate much material waste. Desired finishes are easily applied to the new wire, which will readily take lacquer and plastic coatings.

★ ★ ★

The company was not only concerned with developing a product that could be easily fabricated and colored, but with a flat and half oval wire that would process uniformly and well. The new wire is furnished on 22-inch reels or in coils.

★ ★ ★

The reel contains five times the length of wire more than the coil package, which represents a substantial saving in operating and handling costs.

Greening Expanding Wire Product Divisions

The B. Greening Wire Co., Ltd., Hamilton, Can., has announced the building of a 25,000 sq. ft., one-story plant at Orangeville for its wire fabricating and screen manufacturing divisions.

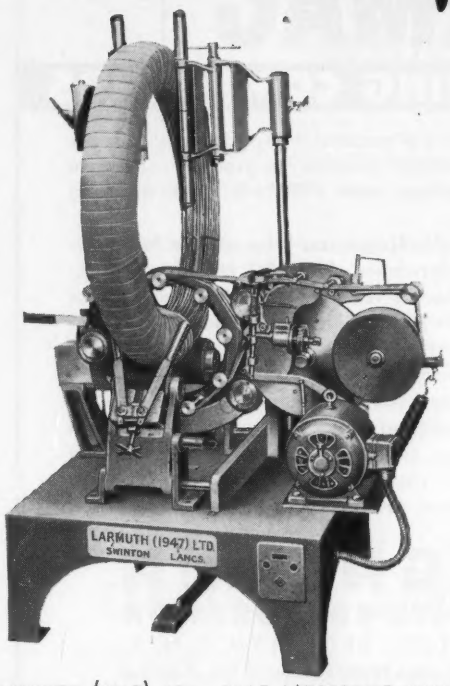
★ ★ ★

At this plant, expected to be placed in operation in September of this year, the company will make a line of vibrator screens, wire baskets, guards and wire partitioning.

Named General Superintendent of Republic Unit

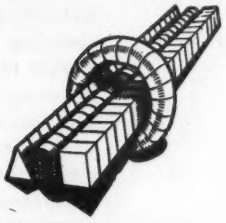
T. H. Hagan has been promoted to general superintendent of **Republic Steel Corp.'s** Gadsden, Alabama, plant.

LARMUTH *Spiral Wrapping* MACHINES



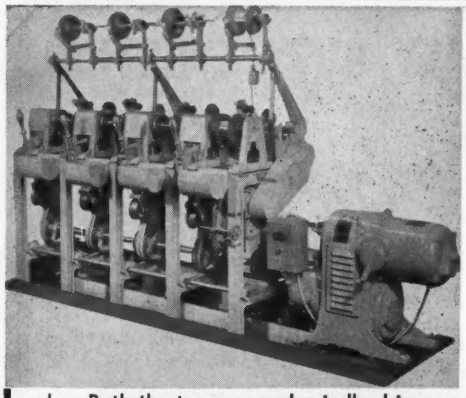
are built to finest British engineering standards and are in use throughout the world for spiral wrapping of Motor Tyres, coils of Wire, Strip, etc., from 3" bore upwards. Also straight length Tubes, Bars, Rods, etc.

"BOUND" to get there safely.



LARMUTH *of England*

LARMUTH (1947) LTD., EAST LANCASHIRE ROAD, SWINTON, MANCHESTER, ENGLAND.
Telephone: Swinton 1015



1900-HV MULTIPLE SPINDLE SPOOLER

SPECIFICATIONS
Size Range: .010" to .080" or heavier if soft and many flat wire sizes.
Max. Spool Size: 16" flange diameter.
Capacity: usually 4 to 8 spindles.

The 1900-HV Spooler is a rigid, precision machine which will consistently produce a uniform, dense wire lay. Both the traverse and spindle drives are regulated through wide-range, stepless, variable speed units, eliminating change gears. The 1900-HV is completely adaptable to your particular constant or changing demands. All controls are positive. Adjustments are made accurately with the spooler in operation and without tools.

Both smooth acceleration and rapid stopping is obtained through a single lever at each station. Spool changing is simple and rapid. Anti-friction bearings are used on all shafting and spindles.

Your special requirements can be incorporated into the design. Each machine is delivered ready for operation from your power supply. Payoff stands furnished as extras.

Consult us on your spooling problems.

ROBERT J. EMORY COMPANY
31 East Runyon Street Newark 5, N. J.

PEAK PERFORMANCE with
PERMAG
DRAWING COMPOUNDS

Over thirty years of successful experience with leading wire manufacturers provide the greatest assurance of better production with PERMAG wire drawing compounds.

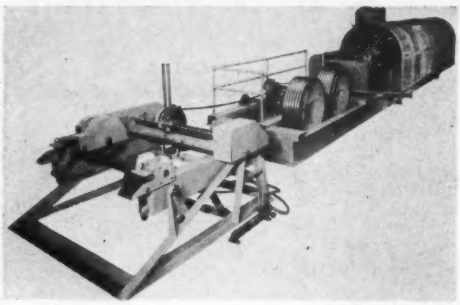
Formulated in the Magnuson laboratories for guaranteed peak performance, PERMAG compounds consistently prove themselves ideal for all types of wire drawing, for both production and economy.

FOR WIRE CLEANING, too, PERMAG offers a group of completely tested formulas that will eliminate pickling trouble and speed drawing production.

A Magnuson representative will be glad to demonstrate the proven superiority of PERMAG cleaning compounds. Or, if you wish, a letter will bring you a complete analysis of your problem, without obligation.

MAGNUSON
PRODUCTS CORPORATION
50 COURT ST., BROOKLYN 1, N. Y.
In Canada: Canadian PERMAG Products, Ltd., Montreal

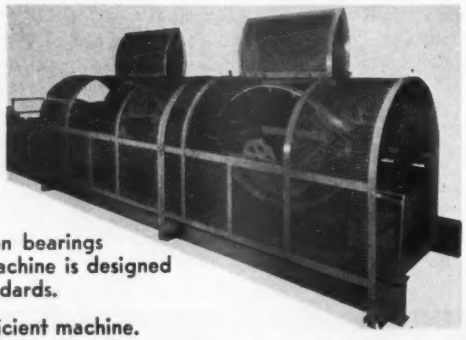
THREE-WIRE HEAVY DUTY TWISTING MACHINE



Built to handle wire from #14 to 500,000 circular mils in size on cradle reels.

Cradle reels either 30", 36" or 48" in diameter.

Rotor speeds from 800 r.p.m. to 30 r.p.m. controlled by gear box and dual drive.



Capstans either single with fleeter sheave or double as shown with diameters of 30", 36" or 42". Rates of lay from 1½" to 36".

Welded steel frame, anti-friction bearings and multiple roll guides. The machine is designed and built to our usual high standards.

An exceedingly versatile and efficient machine.

THE EDMANDS CO., 228 ABORN STREET PROVIDENCE 3, R. I.

Aluminum Wire Drawing

(*Continued from page* 885)

drawing directly from rod to .064; however, results are apparently not too consistent. The annealing cycle varied anywhere from 2 to 4 hours—depending on the equipment used, since it is only necessary that the alloy reach an annealing temperature. The intermediate feeder stock is then drawn from .187—usually through nine carbide dies. Here the standard approach angle of 16 degrees with a bearing of 25 to 30 per cent and a well rounded back relief are employed.

★ ★ ★

In the intermediate drawing operation, heat exchanges are also used to keep the temperature under 120 degrees and are pumped to the dies and capstan with approximately a 40# per square inch pressure. The majority of wire is drawn directly on spools at approximately 2500′ per minute. When the .064 wire is to be sold for further fabrication, material is generally put up in 22″ block coils which are drawn at 2,000′ per minute.

★ ★ ★

Intermediate wire is again annealed in the range of from 660 to 700 degrees F., with a time cycle of from 2½ to 4 hours depending on the type furnace and the load.

★ ★ ★

The 56S fine wire is drawn to .013 through 14 dies usually with B and S reductions of 20.6 per cent. Common practice has been to draw fine wire through diamond dies but many are finding it feasible to draw up to the last four dies using carbides and only using the finished dies with diamonds. Also all carbide dies have been used. This fine wire is generally drawn through a mineral light oil, wax compound, or water soluble oil, again with temperatures ranging under 120 degrees and speeds up to 7500′ per minute. The takeoff packages are either 5# or 15# spools depending on the payoff equipment of the weaver. The final spools of .013 wire are then placed in an oven or furnace to be stabilized.

There seems to be no question about the desirability of filtering the large particles of aluminum from the wire drawing oil. However, there is some question regarding the necessity of filtering the minute particles.

★ ★ ★

Most fine wire drawers seem to prefer a coil supply as far as uniformity of annealing is concerned and continuity in welding coil to coil. The bobbin supply is preferred from the standpoint of tangle free operation.

★ ★ ★

The prime producers and fabricators of clad rods have been most willing to supply interested prospective customers with their best present techniques in this program. It would be well to check with them from time to time for further new developments.

★ ★ ★

The general specification guide for the manufacturer of insect screen wire is the Department of Commerce, Commercial Standard 138-49 for Insect Wire Screening. This bulletin does not spell out in too fine detail the specification requirements of the wire itself, and it is felt by many fabricators that more detail specification should be set up by some industry group.

★ ★ ★

In other fields of aluminum, specification revisions are being made. The counterpart of Copper Circular 31 is being prepared by the Bureau of Standards, ACSR aluminum specifications are currently being reviewed for revision, and the main purpose of these revisions is further standardization regarding sizes to be considered standard and length for fabrication. In the latest ASTM 233 and 232 for ACSR, the most significant change was the increase to 61 per cent minimum conductivity rather than 61 per cent average with a minimum of 60.6 on any individual sample.

★ ★ ★

The last and, to some, the most significant new thing in the field

VINYLS for...

CRITICAL CUSTOMERS

For the past ten years we have specialized in the compounding of Vinyl extrusion and injection molding compounds to specifications, or developing compounds for a specific use.

Underwriters' approved standard compounds are available in all colors for POT, T, TW, 80 Degree C, 90 Degree C and 105 Degree C wires. We also have a compound which will meet requirements of Military Specifications MIL-W-5086.

If you require a Vinyl compound rated higher than 105 degrees C for special applications, we suggest you communicate with us, as we may have a compound to meet your requirements.

Your inquiries are invited.

ELECTRONIC RUBBER COMPANY

69 Sunnyside Ave. • Stamford, Conn.

Sjogren WEDGE GRIP

Used by Wire Men Who Want the Best!

SJOGREN TOOL AND MACHINE CO., INC.

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

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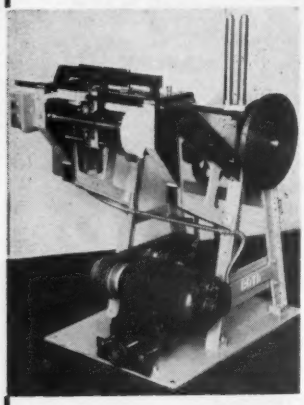
FOR HEAVY DUTY COILING

USE THE NEW BOYD #1200 HEAVY DUTY SPOOLER

Designed for the spooling or coiling of heavy materials on large diameter spools or in coils.



Positive screw reversing mechanism and change gears offer a wide range of distances and speeds for traverse rates to accommodate various sizes of wire or other materials.

Large adjustable slip clutch provides constant speed of winding to allow for build-up and to produce uniformity. This makes this machine an excellent addition to your drawing or finishing machine producing your product at a point where it is to be packaged.

Supplied with gear motor and starter, Hi-Lo pulley and motor base. Can also be had with predetermining counter and auto-stop motion.

Its versatility allows it to be easily suited to meet your particular requirements in spool or coil diameters and traverse widths.

Send for full particulars

BOYD & SONS MANUFACTURING CORPORATION

1434-38 Callowhill St. **Philadelphia 30, Pa.**

speed up your production with

SHEFFIELD
manufacturers wire

Sheffield Manufacturers Wire is drawn from steel made from furnace to finished product in Sheffield's own mills. Quality is checked and guarded at every step. Perfect uniformity and accuracy of gauge are assured, for greatest efficiency in your operation.

Sheffield is prepared to serve your needs quickly for manufacturers wire in any quantity. Get in touch with your nearest Sheffield office.

KANSAS CITY, MO. • TULSA, OKLA.

SHEFFIELD STEEL CORPORATION

HOUSTON, TEX.

of aluminum wire drawing is in the field of human relations. There have been tremendous advances both within our respective companies and between suppliers and competitors. You may have noticed the publicity that the 50th anniversary of Rotary International is receiving. During this celebration they are stressing Rotary's four-way test. This four-way test is:

> **First, is it the truth? Second, is it fair to all concerned? Third, will it build good will and better friendships? Fourth, would it be beneficial to all concerned? These are searching questions which go to the heart of any decision that may confront anyone. It will be noted that no answers are provided.**

★ ★ ★

Being operating men, I know you are all conscious of man-hours and the ease with which they are wasted. While I was preparing this talk I realized with humbleness that there would be a tremendous number of talented man-hours consumed during this brief program. I, therefore, hope it has served its purpose of being a basis for the very fine papers that are to follow on this symposium.

Some Comments on Dry Drawing of Aluminum Wire

(*Continued from page* 889)

aluminum granular powder. These powders have large enough particles so they do not dust around like finer powders. However, they are very likely to pick up moisture and must be kept in a very dry, warm place before use. We have had no such trouble with the Metasap powder.

★ ★ ★

Some modification should be made to the finishing block to permit the aluminum wire to climb better, as conventional design steel blocks do not permit proper climbing.

★ ★ ★

We have found no particular difficulty drawing this grade of aluminum wire at speeds similar to those used in steel drawing.

TO SELL—ADVERTISE IN
WIRE AND WIRE PRODUCTS
It pays—send for rates
453 Main St., Stamford, Conn.

Filtration of Lubricants for Aluminum Wire Drawing

(*Continued from page* 893)

one of a number of filter media, either used alone or in combination, to produce required degree of filtration necessary. Also, interchangeability of filter leaves to conform with area requirements.

4—By-pass system eliminates necessity of shutting down production for servicing the filter.

5—The use of adequately filtered oil eliminates need of frequent shutdowns of production equipment for cleaning and desludging.

6—Purchases or requirements of oil decreased to an absolute minimum.

7—Die life increased and use of less expensive type dies made possible.

8—Wire drawn per machine speeded up.

9—Use of additives greatly reduced due to continuous filtration.

10—Use of adequately filtered oil eliminates possibility of clogged oil passages thereby causing burned dies. Unfortunately the sequence of clogged jet to burned diamond to new diamond means an expense about 5 to 6 times greater than the cost for reworking a worn die.

New Bulletin on Nodular Iron

The Aetna-Standard Engineering Company, Pittsburgh, Pa., has released an eight-page product information bulletin on Nodular Iron for Rolls and Castings. Bulletin includes: Explanation of Nodular Iron; qualities; physicals; specifications on different types; plant production illustrations; roll and casting applications; questions and answers about the material. Available through the Aetna-Standard Engineering Co., Frick Building, Pittsburgh 30, Pa.

Correction

The Editor wishes to correct a statement made on page 685 of the June issue, which reads, "Pyrotenax safety insulated cable, a British development . . .". What this should have read was, "Pyrotenax safety mineral insulated cable was originated by the French and patented by the Societe Alsacienne de Constructions Mecaniques, in Clichy, France; and Le Conducteur Electrique Blinde Incombustible in Paris; and further developed by the British, being manufactured under license in France, England, Canada, and America.

DANFORTH

FIRST QUALITY—PROPERLY-GRADED

DIAMOND POWDERS

Will give you maximum • • •

Value • Service • Economy

For this you pay a little more in first cost, but on which you save in faster work, in superior die finish and in better wire drawn. DANFORTH POWDERS are uniform in purity, quality, grain shape and accuracy of grading.

COMPLETE RECLAIMING SERVICE

The DANFORTH PROCESS of reclaiming produces powders that are *guaranteed* to be 99% or better pure.

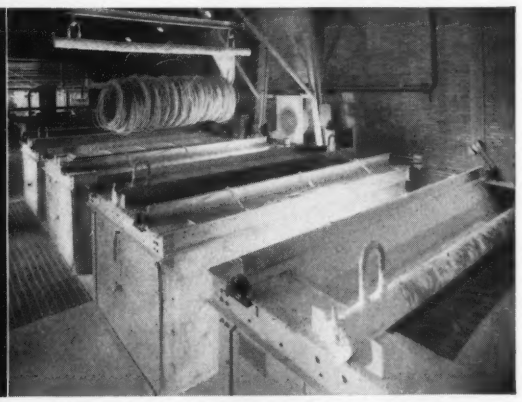
Write today for information on new & reclaimed powders.

C. W. DANFORTH COMPANY

P. O. Box 448 Established in 1912 **Youngstown, Ohio**

carl mayer

HI-SPEED REGISTERED **ROD BAKERS**



Faster baking, greater fuel economy, maximum production efficiency are just a few of the results of the exclusive heating arrangement of the Carl Mayer Hi-Speed Rod Baker. It also has a patented blow-off feature which removes moisture without damage to coils.

Here are just a few of our many satisfied customers:

American Steel & Wire Co.
Atlas Steel Co.
Colorado Fuel & Iron Corp.
Crucible Steel Co. of America
B. Greening Wire Co., Ltd.
Indiana Steel & Wire Co.
Jones & Laughlin Steel Corp.
Republic Steel Corp.

Write for Bulletin No. 350

Patent Nos.
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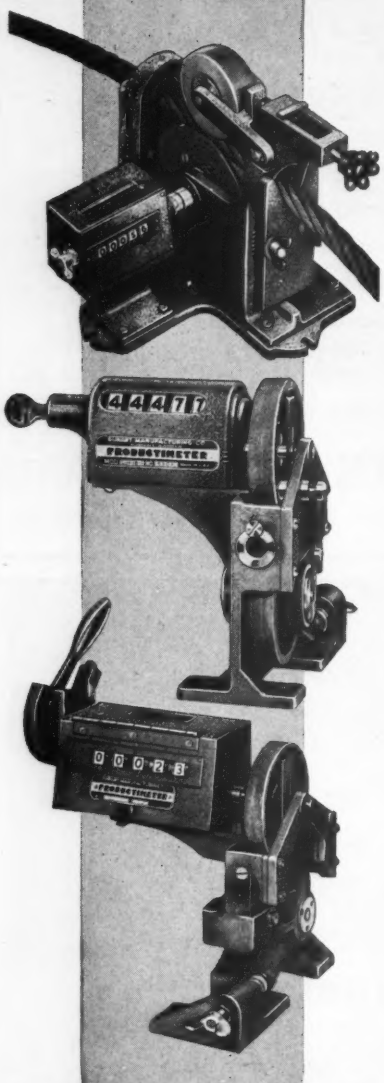
2,323,828
2,235,559
Canada 396,144
401,589

THE **carl mayer** CORP.

3030 EUCLID AVE., CLEVELAND 15, OHIO

OTHER PRODUCTS: Core Ovens • Mold Ovens • Welding Rod Ovens • Heat Treating Ovens & Furnaces • Special Processing Equipment and Accessories.

PRODUCTIMETER
WIRE MEASURING MACHINES
Fast . . Accurate . . Dependable . . Legible



Productimeters measure all types of wire from .010 to 1½ inches in diameter . . . at speeds up to 5,000 feet per minute. They eliminate "guess-work" . . . insure profitable operation in your plant.

Send for Catalog No. 40

DURANT MFG. CO.
1918 N. Buffum St. Milwaukee 1, Wis.
118 S. Water St. Providence 3, R. I.
Representatives in Principal Cities

PRODUCTIMETERS
SINCE 1879 *Count Everything*

Inorganic Fibrous Insulations

(*Continued from page* 895)

Nickel clad copper which is drawn from a copper rod covered with a nickel tube has a current carrying capacity of 70 per cent that of copper. Nickel at room temperature is rated at only 22 per cent. At 200°C nickel is rated at 40 per cent of the conductivity of copper at that same temperature. This is due to a slower rise in the temperature resistance curve of nickel as compared to copper. Monel has good heat resistance, but a lower current carrying capacity than nickel. In some cases, nickel plated iron has been used as a conductor, especially during the time when nickel was difficult to obtain.

★ ★ ★

The higher current carrying capacities of wires and cables in the National Electrical Code are now assigned to all asbestos or asbestos and varnished cambric tape combinations of insulation. It is quite possible that by combining asbestos or glass with the more recent developments of semi-organic insulations, some changes may take place. Such changes might see new items added to existing classifications or might take the form of new ratings of one or more temperatures.

★ ★ ★

With each new development of electrical insulating materials by modern chemistry, we are prone to consider these as cure-alls for what ails the run-of-the-mill insulations. In time we see each one evaluated and classified in accordance with its limitations. In the meantime we go on using the materials which we know are proved by time and continue to watch for newer developments which we know are sure to come.

Needle Company Expands Plant

Arrow Needle Co., a subsidiary of **Textile Machine Works,** Reading, Pa., is building another plant at Manchester, N. H., that will increase its floor space from 17,000 to more than 27,000 sq. ft.

★ ★ ★

WHAT HAPPENS TO LOOSE ENDS?

Some people believe in tying up the loose ends. We believe there's an easier way of eliminating them.

Loose, frayed ends on glass-braided wire that has been stripped and tinned are a real problem. They look messy. They get in the way. And the increased diameter of the wire defeats the engineer's efforts to make room for the greatest possible number of wires.

Our laboratory's contribution to the solution of this problem was to develop a NELCO saturant that does a slick job of controlling and keeping flat those frayed ends of glass braid. This is the saturant's primary job but it has some other very fine qualities.

First of all, it operates as a barrier coat between the primary insulation and subsequent lacquering. This results in much higher insulation resistance.

Secondly, it resists discoloration due to ultra-violet exposure.

Thirdly and importantly, this NELCO saturant in no way adds any flammability to the finished wire.

And finally, the saturant is easily applied either in a lacquering tower or during the braiding operation.

Instead of worrying, wondering what to do about those loose, frayed ends on your glass-braided wire, turn the problem over to us and we'll show you how to make every strand lie down in its proper place.

Chemical Products
CORPORATION
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CUT labor costs 1/2 with the New type "M" automatic

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The Standard of the Wire Industry

West Coast Regional Meeting of the Wire Association

(*Continued from page 896*)

E. F. Houghton Co.—Pen and Pencil Set

E. J. Bartell Co.—Pocket Ronson
Diamond Springs Lime Co.—Table Ronson

Pacific Smelting Co.—Gift unknown.

* * *

Arrangements for the West Coast Regional Meeting were made by a Program Committee headed by **William Mohr,** Wire Mill Superintendent of the Pacific Coast Division of The Colorado Fuel and Iron Corporation, Oakland California, who served as **General Chairman.** Members of the Committee working with Mr. Mohr were:

Sterling Edwards, President, E. H. Edwards Company, South San Francisco

Earl R. Potter, President and General Manager, Industrial Wire Products Corp., Los Angeles

Joseph F. Conlan, Treasurer, K. H. Davis Wire and Cable Corp., Los Angeles

* * *

A few days after the meeting the Association received an enthusiastic letter reading in part: "I thought the meeting in S. F. was one of the finest held on the West Coast during the past years and it paid off in the interesting visit to the Edwards Company's fine plant. The Edwards Company did themselves proud on this visit and the luncheon, and nothing can be said about it that is too good. Bill Mohr did an excellent job on the details of the meeting and should be complimented highly for his outstanding job. I had a wonderful time seeing all the old gang and meeting some new friends and took the opportunity to visit several new and different plants during the week, as well as seeing some of the old ones again."

* * *

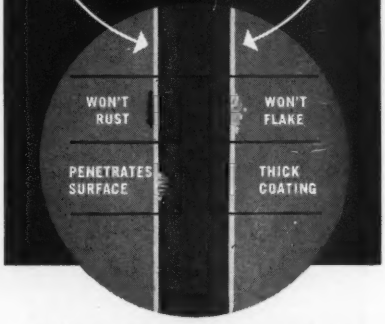
They did it again! The 1955 meeting at San Francisco was most successful from every point of view and the officers and directors of the Association take this opportunity to express their very sincere appreciation of the good work of this committee.

* * *

Major Richard E. Brown, Ex-

Here's why you should coat high and low carbon steel rod with

BORAX 5 MOL.



No Dust... For a cleaner shop—pleasant working conditions and easier house keeping. Borax-coated rod does not dust or flake, can be held in storage longer and is pleasanter to handle.

No Baking... The Borax solution penetrates the porous surface of the metal, neutralizing deepseated acid, and eliminating the need for baking.

Longer Storage... The continuous film of Borax inhibits the formation of rust for a considerable period—particularly important where several days may elapse between coating and drawing.

Economical... A single dip in the Borax bath provides a thick durable coating which is very valuable where the wire is to be drawn in several stages.

Write to our Technical Department for further information.

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DIVISION OF BORAX CONSOLIDATED LIMITED
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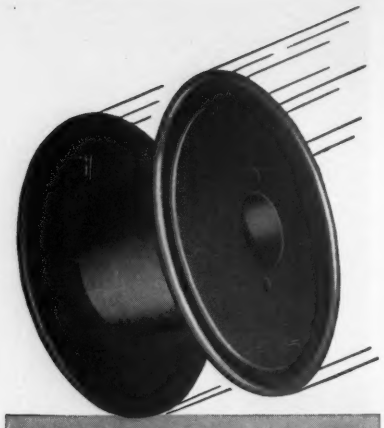

Apco Mossberg Company has been turning out balanced and true reels for over half a century, beginning as the original Frank Mossberg Company. We have one primary purpose, and that is to design and manufacture better steel reels, spools and bobbins for the wire industry.

Bring your reel problems to us. Our engineering service is equipped to give your problem individual attention. Suggestions and solutions will be offered without obligation. Write today.

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San Francisco 5, Calif.

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HUGH P. WILLIAMS & CO.
47 Colborne Street, West
Toronto, Ontario, Canada

The original Frank Mossberg Company

APCO MOSSBERG CO.
ATTLEBORO, MASS.

ecutive Secretary, and Mrs. Ruth S. Spengel, Assistant Executive Secretary, were in attendance from the Wire Association's headquarters in Stamford, Conn.

Fine Wire

(*Continued from page* 898)

In closing, I would like to emphasize that each grade and quality variation in wire has a proper and useful place depending upon the end use and methods of fabrication. In all phases of wire production, various practices are employed which determine the type and quality of the finished material. Diversion and loss of product are sometimes necessary in order that quality requirements can be met.

★ ★ ★

The conception that all wire is the same except for chemical composition is false and misleading and the distinct limitations inherent in different steel qualities should be understood in order to prevent possible misapplication with resulting disappointment in processing and service.

Payoffpackaging

(*Continued from page* 901)

drums. That's our business. But actually its a natural development of your own industry. The idea was conceived and made practical by a wire man. Wire men are responsible for the greatly broadened fields to which it is being adapted today. Wire men are working right now on still other applications which will come to light in the months ahead. It's no longer just an interesting curiosity, but a very practical money-making production tool for producers and consumers alike. And it is you wire men who will further develop the system and carry it to its logical place in the industry. The Payoffpak is your baby, and it does pay off—in dollars.

General Cable Expanding

General Cable Corporation, leading manufacturer of electrical and communications wire and cable, has entered into a contract for the acquisition of **General Insulated Wire Works, Inc.,** of Providence, R. I., according to an announcement by **I. T. Bennett,** chairman of the board and **J. R. MacDonald,** president.

★ ★ ★

With the acquisition of this additional plant, General Cable adds a new line of products to include rubber, neoprene and plastic power supply cords with molded-on rubber or plastic attachment plugs and devices, electrical cord sets, bulk lamp cords and portable power cords.

★ ★ ★

C. J. Craig, president of General Insulated Wire Works, will be appointed a vice president of General Cable, with responsibility for the Providence operation. This plant occupies approximately 100,000 square feet, employs about 300 people and has a weekly capacity of several million feet each of single conductor rubber jacketed and braided types of wire and an equivalent amount of plastic single conductor feet.

★ ★ ★

It was also announced that General Cable Corporation will construct a modern, new plant in Monticello, Ill.

★ ★ ★

This new manufacturing facility will increase General Cable's production of paper telephone cable by approximately 25%. The initial plant facilities, specifically designed for manufacturing telephone cables, will be completed by November and in full operation by the end of the year.

★ ★ ★

General Cable announced also the completion of arrangements with **Canada Wire & Cable Company, Ltd.,** for the formation of a new company to manufacture a complete line of telephone wires and cables in Canada. The new company, **Telecables & Wires Ltd.,** will be owned jointly by General Cable, Canada Wire & Cable and the British firm of Telegraph Construction & Maintenance Company, Ltd.

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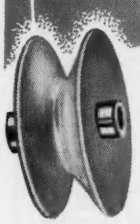

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HEANY INDUSTRIAL CERAMIC CORP.
NEW HAVEN 3, CONNECTICUT

Booklet on Operation of Audiometers

With employee hearing measurement programs becoming of top importance to industry because of recent court decisions, new legislation and a growing concern over the problem of plant and factory noise, a new booklet just published by Employers Mutuals of Wausau proves both timely and informative.

★ ★ ★

The new manual is intended to furnish training and reference material for those who are learning to operate audiometers to conduct pre-employment hearing measurements. Particular emphasis is placed on the techniques required in securing accurate data and the proper method of recording findings obtained from the examinations. It is based on information gathered by the insurance firm in more than a year's experience in setting up this kind of program at both the industrial and community level.

★ ★ ★

Copies of the guide may be obtained, without charge, by writing to: Accident Prevention Department; **Employers Mutuals of Wausau,** Wausau, Wisconsin.

Naugatuck Vinyl Resin Gets UL Approval

Underwriters' Laboratories Inc. has approved Marvinol VR-22, a vinyl resin for extrusion from dry-blend or granular compounds for electrical applications made by **Naugatuck Chemical** division, **United States Rubber Co.**

★ ★ ★

According to a statement by the UL, the resin can be used interchangeably in any approved wire insulating formulations based on straight polyvinyl chloride. The resin is of medium high molecular weight. It has good blending characteristics and permits shorter Banbury cycles. In dry-blend extrusions it has good uniformity, which is important in extruding, and extrusion speed rates are high.

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The drawing of wire, bars, tubing, stampings, shells, shell cases, cold heading, and many other cold forming operations—including the cold extrusion of steel—are greatly facilitated by the application of a "Granodraw" zinc phosphate coating and a suitable lubricant prior to working.

Write for Descriptive Folder

AMERICAN CHEMICAL PAINT CO.

AMBLER, PA.

Detroit, Mich. Niles, Calif. Windsor, Ont.

During the past year this resin has been used for wire insulation in telephones, aircraft transmissions and automobiles. In these applications VR-22 has mixed and blended well, and compounds based on it have high volume resistivity, with good resistance to cold cracks and cut through.

★ ★ ★

New Flat Wire Rolling Mill Announced

A new development of the Special Products Division of **W. S. Rockwell Co.**, Fairfield, Conn., is a small rolling mill for the cold reduction of round wire to flat wire. The mill features a rotary straightening machine to remove the kinks, bends and peripheral cast from the coil before it enters the guides which hold it in position while it is being cold reduced. This device also has a polishing effect on the wire, thereby assuring bright straight wire. This arrangement at the entering side also prevents wandering which causes crooked finished wire.

★ ★ ★

The rolls used in this mill are unusual in that they are composed of mandrel of high torque-resisting steel and a roll body of bearing steel, shrunk over the mandrel. This roll body is polished to a high uniform finish free of pit marks and blemishes. There is no loss of hardness from regrinding the surface, therefore, the hardness throughout the entire cross section of the roll body is uniform. Another feature is that when maximum roll life is reached, the outer ring or roll body may be heated slightly, pushed off and another ring pressed on. The rolls are driven from a 5 HP motor, underneath the stand, through a chain drive.

★ ★ ★

Heavy duty needle bearings are used at the roll journals and two vertical thrust surfaces are provided to prevent lateral thrust movement. Lubrication is provided to all the bearings through a one slot lubricating system.

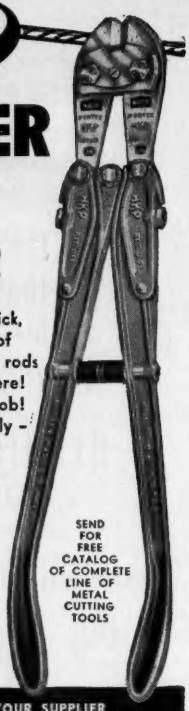
★ ★ ★

HKP PORTER

Center-Cut METAL CUTTER

Here's the tool for quick, efficient, easy cutting of medium hard wire and rods up to 5/8". Cuts anywhere! In the shop or on the job! Utilizes hand power only – exclusive toggle joint multiplies man power eighty times. In six different sizes and capacities.

Also available with rounded cutting edges for harder metals.



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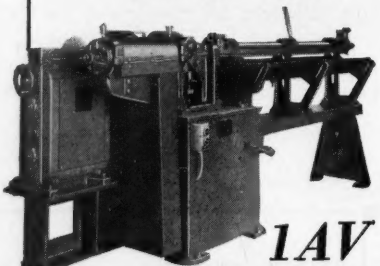

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- Spring Wire, max. dia. 1/8"

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- DIAMOND POWDER RECLAMATION — Exclusive process that gives maximum recovery. Send us your old cotton, die washings, worn wheels and sludge. High salvage percentages will pay you well.
- DIAMOND POWDERS—Complete line of graded quality powders for all lapping and finishing operations on wire drawing dies. First grades only.
- DIAMOND GRINDING WHEELS—A complete line of top-quality wheels for industrial production.

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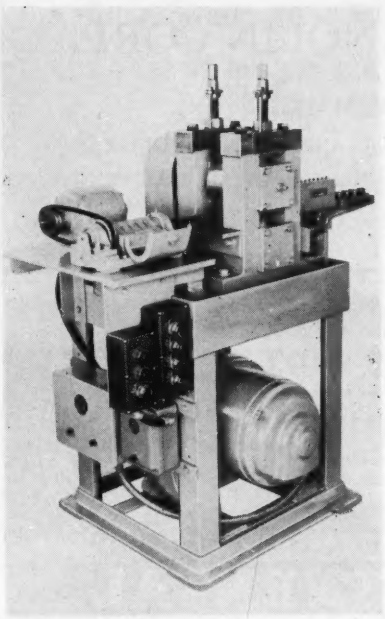
The rolled flat wire is then passed through edging rolls which keep the wire in alignment and also smooth and brighten the edges.



Rockwell's New Flat Wire Rolling Mill

The screw down pressure can be effected through conventional threaded screws, or by air or hydraulic pressure. A take-up can be supplied for either straight or transverse winding.

★ ★ ★

After passing through the edging device, the wire then passes through a multi-roll horizontal and vertical levelling unit.

★ ★ ★

The controls for this mill, mounted convenient to the operator, consist of a pilot light, run, job, reverse and stop buttons.

New Handbook of Industrial Heating Facts

A new handbook designed to provide plant management and engineers with basic concepts of industrial heat processing and heat control is being distributed on request by the **Michigan Oven Company** of Detroit.

★ ★ ★

The plant executive concerned with heat processing costs and

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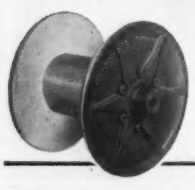

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efficiency will find this book of "Oven Facts" pruned of technical language. Here is a heat handbook that will carry him from a discussion of heat to fuel cost comparisons to design elements, in highly readable English.

★ ★ ★

Engineer readers, regardless of the type of heat processing they use, will find the booklet a "refresher" course in process heating. It provides considerations in modern oven construction, oven heat control, design objectives, etc., and will acquaint them with recent process heating developments. The common formulas used in calculating heat and oven requirements are also included.

★ ★ ★

For your copy of the handbook write: Michigan Oven Company, 415 Brainard, Detroit 1, Michigan.

Announces Two Hydraulic Fluids

Two new fire-resistant hydraulic fluids engineered to meet special high and low viscosity requirements now are available in commercial quantities from **Monsanto Chemical Company's Organic Chemicals Division.**

★ ★ ★

The new fluids, trademarked Pydraul 150 and Pydraul 600, are reported to have the same fire-resistance, lubricity, non-toxicity and non-corrosiveness as the company's widely-accepted Pydraul F-9. They supplement the latter product by providing viscosities which more fully encompass the range of hydraulic fluid requirements, according to Monsanto.

★ ★ ★

Pydraul 150, with a viscosity index of 170 and a pour point of -55°F., is designed for use in outdoor installations, primarily within the steel industry, where systems are exposed to low ambient temperatures.

★ ★ ★

At the opposite end of the viscosity range, the new Pydraul 600 has a viscosity index of 30 and a pour point of 15°F. Designed for presses, compressors and die-casting equipment, its S.U.S. viscosity

of 625 at 100°F. compares with 220 for Pydraul F-9 and 150 for the new Pydraul 150.

★ ★ ★

Samples and detailed information on their properties are available on request.

New Low Cost Spring Tester

This inexpensive portable spring tester is used for checking loads and deflections of compression springs. It is especially useful in factory production lines, receiving and inspection departments and is the lowest priced spring tester with this capacity on the market. It is easily operated. Simply place a spring on the

Carlson's New Spring Tester

platform and pull handle downward. Loads are shown in both pounds and kilograms on a four inch diameter dial and lengths are shown in both inches and millimeters on a two color etched metal rule. An adjustable stop permits production testing at speeds up to 800 tests per hour. The capacity is from 1 to 250 lbs. (113 Kilograms) with lengths up to 4-5/8″ (117.5 mm.) Price $75.00. Descriptive bulletin available from **The Carlson Company,** 277 Broadway, New York 7, New York.

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Onto Single and Multiple Conductor Wires
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SIZE: coils, spools or straightened cut to length.
FINISH: plain, galvanized, coppered or tinned.
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MACHINERY FOR HIGH SPEED PRODUCTION
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Music Wire for Industrial Purposes
211 sizes Bright Polished, .0015" to .3437"
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Phosphor Bronze, Spring Temper—Pure Iron Wire—Resistance Wire,
Hoskins Chromel "A"—Stainless, Soft and Spring Temper—Tag Wire, 1000
in an Envelope—Florist Wire—Spooled and Coiled, ¼-½-1-5#
Wires Straightened and Cut to length—Small Gauges—Small orders our specialty
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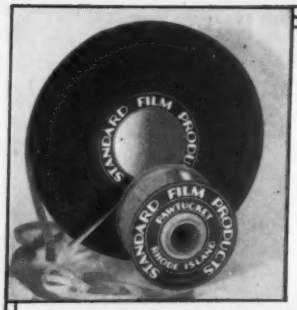

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MACHINES
All Machines Reconditioned in Our Own Shop
WIRE & TEXTILE MACHINERY INC.
P. O. BOX 436, PAWTUCKET, R. I.

Anaconda Aluminum Plant Began Operations in July

The first company to enter the primary aluminum field in this country since 1946 started turning out ingots in July.

★ ★ ★

It is the **Anaconda Aluminum Company,** whose reduction plant is near Columbia Falls, in a mountain valley of northwestern Montana.

★ ★ ★

The new producer is 95 per cent owned by what had been known since 1895 as the **Anaconda Copper Mining Company.** The parent company's new name—**The Anaconda Company**—became official in June on its sixtieth birthday. The name was changed because of the concern's growing importance in industries—like aluminum—that have little relationship to its original identity.

★ ★ ★

The new plant has an annual capacity of 60,000 tons of aluminum, but it is not expected to reach full production until the end of this year. The first of its two "potlines," is scheduled for operation in July, the second sixty to ninety days later.

★ ★ ★

The plant is in a scenic setting on the Flathead River, about fifteen miles from Glacier National Park. It will obtain its electrical power from the Hungry Horse Dam, a Federal reclamation project facility that started production less than three years ago. The dam is seven miles away.

★ ★ ★

Exhaustive study of the Pechiney process convinced Anaconda that it was potentially much more efficient than the methods used in this country, and the French technology was adopted for the Columbia Falls plant. It involves modification of design of the electrolytic cell in which aluminum is made, so as to eliminate atmospheric contamination from fumes, minimize power consumption and increase daily yield. The engineers say it also permits improved working conditions for employes.

Anaconda feels the time spent obtaining the new plant design was well used—that if an older system had been adopted the Columbia Falls plant might have been outdated by the time it was completed. It is estimated that the expense of switching plant sites and installing the process based on the French design, however, will bring the cost of the completed plant close to $65,000,000, compared with the $50,000,000 originally contemplated.

IDA to Exhibit at Production Engineering Show

The Industrial Diamond Association of America has taken space No. 139 at the Production Engineering Show, September 6-16, 1955 on the Navy Pier.

★ ★ ★

Featured at their booth will be illustrations of various manufacturing processes which depend upon industrial diamond tools and products because of the growing importance of industrial diamonds in the American economy and the cutting of costs through their medium. There will also be a limited exhibition showing the various types of diamond tools and products and a distribution of I.D.A.'s illustrated papers on their best and most up-to-date use and care.

★ ★ ★

A most attractive feature of I.D.A.'s exhibition will be the display of diamonds as mined, an extensive series of industrial diamonds as many sizes and types, illustrations of diamond mining, and exact replicas of world-famous gem diamonds of history.

★ ★ ★

Preparations are in the hands of a Chicago committee of I.D.A. and the executive office in New York. Visitors will be welcomed by the Association's Executive Manager, **Athos D. Leveridge.**

Fastener Concern Moves

Harrison Bolt & Nut Co., manufacturer of stainless and alloy bolts and nuts, has moved to larger quarters at 2781 Wilkens Ave., Baltimore. **A. L. Byrd** is president.

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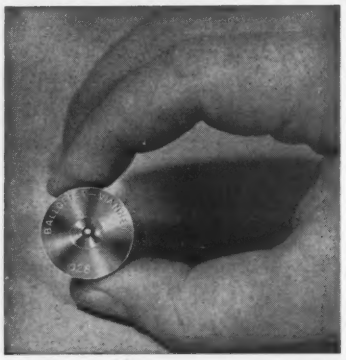

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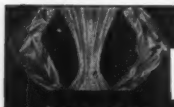

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Folder Describes Radiant "O" Tubes

A new folder has been issued by **Lee Wilson Engineering Co.**, 20005 W. Lake Rd., Cleveland 16, Ohio, describing their Radiant "O" Tube annealing furnaces.

★ ★ ★

This type of construction, exclusive with Lee Wilson furnaces, can be incorporated in furnaces that are designed to suit any job application. Advantages claimed are controlled vertical heat, uniform horizontal heat, low maintenance, fuel economy and low tube cost per ton. In the last connection, the cost per ton of annealed metal is estimated at three cents.

★ ★ ★

Copies of the folder are available upon request.

Alpha Metals Marks 25th Anniversary

Alpha Metals, Inc., Jersey City, N. J. is celebrating its 25th anniversary of the founding of the modern phase of its business. The company is a major producer of fabricated tin and lead products and allied products.

★ ★ ★

Founded in 1930 by its president, **Harold Shonberg**, the company has achieved a steady growth over the past quarter of a century until today it is a foremost supplier of solder and fluxes to the electronics, electrical, jewelry, and related industries.

★ ★ ★

The manufacturing facilities were originally located in Brooklyn, N. Y., but the need for additional space resulted in the company moving to its present location at 56 Water Street, Jersey City, in 1948. This modern plant has complete facilities for extrusion, rolling and casting, and produces solid wire solder, rosin core solder, acid core solder, lead anodes, tin-lead anodes, sheet lead, solder preforms, external soldering fluxes and other products.

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Metal Statistics

The 1955 edition of Metal Statistics has been published by **American Metal Market,** 18 Cliff St., New York 38, N. Y.

★ ★ ★

Besides the addition of several new statistical tables, a new quick-reference index has been included on the front fly-leaf to facilitate the quick location of classifications.

★ ★ ★

This directory, a metals buyers' guide, contains 864 pages and sells for $3.50. It is the 48th annual issue.

New Clutch-Brake Unit

Wire Insulating Machinery Inc., 35 Hudson St., Northboro, Mass., has issued a bulletin on their WIM clutch-brake unit for machinery.

★ ★ ★

The device is electrically operated and controlled. It is ruggedly built, is adjustable through a torque rheostat for fast and positive or slow and easy stopping and starting, and requires no wear adjustments through its life.

★ ★ ★

Bulletin No. WIM-6.1, describing the unit, will be sent upon request.

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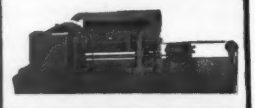

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Durkee Manufacturing Company, Incorporated

The Durkee Manufacturing Company which has operated since 1949, became incorporated under the laws of Minnesota as of July 1, 1955. With the change, they assure the continuation and growth of the company, and will be in a position to serve their customers and associates better. The policies and personnel of the company will remain the same.

Metal & Thermit Advances Two To Sales Executive Posts

George C. Betz has been appointed manager of Sales, Chemical & Metals department, **Metal & Thermit Corporation,** New York, N. Y. In his new post he will manage sales activities for the company's industrial chemicals and plating materials, ceramic products and metals and alloys. Mr. Betz has been associated with Metal & Thermit since 1944 as sales manager of the ceramics department.

★ ★ ★

William C. Cuntz has been named assistant manager of sales, welding department. He will assist **Robert T. Brown** manager, in sales of Thermit welding materials and equipment. He joined Metal & Thermit in 1936 and had been assistant in rail welding research and district manager at Pittsburgh.

Joins Inco's Development and Research Division

C. Roger Sutton, senior metallurgist at the Argonne National Laboratory of the U. S. Atomic Energy Commission for the past five years, has joined the Development and Research Division of **The International Nickel Company, Inc.,** as a member of the Stainless Steel and Heat Resistant Alloys Section, according to an announcement by **F. L. LaQue,** Vice-President and Manager of the division.

★ ★ ★

Mr. Sutton is a graduate of the University of Detroit, where he received the degree of Bachelor of Chemical Engineering in 1927 and the Master of Science degree in 1928.

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Carbro Chemical Company, Pawtucket, R. I.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Chicago

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.
Miller, R. H. Co., Inc., Homer, N. Y.

COMPOUNDS—Diamond (Pre-Mixed)
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago.
Rusch Wire Die Corporation, Croton-on-Hudson, N. Y.
United States Industrial Diamond Corp., New York, N. Y.

COMPOUNDS—Extrusion, for Wire
(See COMPOUNDS—Vinyl)

COMPOUNDS—For Improving Drawing and Extrusion
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—For Insulated Wire
Carbro Chemical Co., Pawtucket, R. I.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Phosphate Coating
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corporation, Lawrence, Mass.
Apex Alkali Products Co., Philadelphia, Pa.
Rome Soap Manufacturing Co., Rome, N. Y.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corporation, Brooklyn, N. Y.
Standard Industrial Compounds Co., Chicago.

COMPOUNDS—Vinyl, for Wire
Electronic Rubber Co., Stamford, Conn.
Monsanto Chemical Company, St. Louis, Mo.
Naugatuck Chemical Div., U. S. Rubber Co., New York, N. Y.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Ironsides Co., The, Columbus, Ohio.
Magnuson Products Corporation, Brooklyn, N. Y.
Miller, R. H. Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Pacific Coast Borax Co., New York, N. Y.
Rome Soap Manufacturing Co., Rome, N. Y.
Standard Industrial Compounds Co., Chicago.
Swift & Company, Chicago, Ill.

CONDUCTORS—Flexible, Electrical
Montgomery Co., The, Windsor Locks, Conn.

CONTAINERS—Wire Packaging
(See DRUMS—Wire Packaging)

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

COUNTERS—
(See MACHINERY—Measuring Wire and Cable)

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Vascoloy-Ramet Corp., Waukegan, Ill.
Willey's Carbide Tool Co., Detroit, Michigan.

CUTTING TOOLS—Wire
Porter, H. K. Inc., Somerville, Mass.
Robinson, M. W. Co., Rockfall, Conn.

DIAMONDS—Industrial
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Molina-Straus Diamond Products Co., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
United States Industrial Diamond Corp., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDERS—
Danforth, The C. W. Co., Youngstown, Ohio
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Industrial Diamond Powders, Inc., Pittsburgh, Pa.
Kelly Wire Die Corp., New York, N. Y.
Molina-Straus Diamond Products Co., New York, N. Y.
National Research Company, St. Clair Shores, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
United States Industrial Diamond Corp., New York, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDER RECLAIMING—
Danforth, The C. W. Co., Youngstown, Ohio
Industrial Diamond Powders, Inc., Pittsburgh, Pa.
Kay & Warren Co., Brooklyn, N. Y.
Kelly Wire Die Corp., New York, N. Y.
National Research Co., St. Clair Shores, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Molina-Straus Diamond Products Co., New York, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Michigan.

DIES—Carbide, Tungsten & Tantalum
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh. Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Vascoloy-Ramet Corp., Waukegan, Ill.
Wayne Wire Die Co., Hillside. N. J.
Willey's Carbide Tool Co., Detroit, Michigan.

DIES—Cold Heading
Carboloy Dept. of General Electric Co., Detroit
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Vascoloy-Ramet Corp., Waukegan, Ill.
Willey's Carbide Tool Co., Detroit, Michigan.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Cochaud Wire Die Inc., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
National Wire Die Co., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIES DIAMOND—Reversible
National Wire Die Co., New York, N. Y.

DIES—Extrusion
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Michigan.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.

DIES—Nail, Nail Cutters, Feeder Blocks, Grippers, etc.
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc, New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit.
Cochaud Wire Die Inc., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Ft. Wayne Wire Die., Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio
National Wire Die Co., New York, N. Y.
New England Wire Die Co., Worcester, Mass.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Vascoloy-Ramet Corp., Waukegan, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Special Shapes, Etc.

Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.

DIES—Swaging

Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tube Drawing

Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y
Vascoloy-Ramet Corp., Waukegan, Ill.
Willey's Carbide Tool Co., Detroit, Michigan.

DRAW BENCHES—

(See MACHINERY—Draw Benches)

DRUMS—Wire Packaging

Continental Can Company, Van Wert, Ohio

DRUMS & TRAVERSES—For Cable Reels

Entwistle, James L., Co., Providence, R. I.
Hubbard Spool Co., Garrett, Ind.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

DRYING EQUIPMENT

Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio.
Michigan Ovens, Inc., Detroit, Michigan.
Rockwell, W. S. Co., Fairfield, Conn.

ENGINEERS—Consulting

Lubricants—Hans C. Bick, Inc., Reading, Pa.
Wire Mill—Clarence S. Arms, Worcester, Mass.

EYELETS—Brass or Zinc

Platt Bros. & Co., The, Waterbury, Conn.

FENCING & FENCES—Wire

Interlocking Fence Co., Morton, Ill.

FILM—Insulating

Standard Film Products Corp., Pawtucket, R. I.

FINISHERS—Flame Proof, for Wire

Carbro Chemical Co., Pawtucket, R. I.

FOAM PRODUCING COMPOUNDS—

American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Brazing

Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.

FURNACES—Galvanizing Equipment

Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Heat Treating

Ajax Electric Co., Inc., Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio
Drever Company, Phila., Pa.
Rockwell, W. S., Co., Fairfield, Conn.
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Lead Melting

Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.

FURNACES—Pot (oil, gas, electric)

Ajax Electric Co., Inc., Philadelphia, Pa.

FURNACES—Resistance Heating, Strand

(See Annealing Machines)

FURNACES—Salt Bath

Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.

GALVANIZING EQUIPMENT — (See MACHINERY—Galvanizing Wire)

GRINDERS—Roll

Norton Co., The, Worchester, Mass.

GUIDES—For Wire

Heany Industrial Ceramic Corp., New Haven, Conn.
Lignum-Viate Products Company, Jersey City, N. J.

GUIDE TIPS—For Extruding Machines (See NOZZLES)

HAMMERS—Nail Heading

Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

HAMMERS—Swaging

Sjogren Tool and Machine Co., Auburn, Mass.

HARDSURFACING ALLOYS—

(See Alloys—Hardsurfacing)

HOOKS—Pickling & Liming

Lewis Welding and Engineering Corp., The, Bedford, Ohio
Youngstown Welding & Eng'g' Co., Youngstown, Ohio

HOISTS—Electric Travelling

Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

INHIBITORS—Pickling

American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INSULATING MATERIALS—

Carbro Chemical Company, Pawtucket, R. I.
Celanese Corporation of America, New York, N. Y.
Chemical Products Co., E. Providence, R. I.
Electronic Rubber Co., Stamford, Conn.
Monsanto Chemical Co., St. Louis, Mo.
Naugatuck Chemical Div., U. S. Rubber Co., New York, N. Y.
Pittsburgh Plate Glass Company, Pittsburgh, Pa.
Plymouth Cordage Company, Plymouth, Mass.
Standard Film Products Corp., Pawtucket, R. I.
Synthetic Thread Corporation, Bethlehem, Pa.

INSULATING MATERIALS — Paper—For Electric Wire Cable

Plymouth Cordage Company, Plymouth, Mass.

KETTLES—Galvanizing

National Annealing Box Co., Washington, Pa.

LACQUERING SYSTEMS — See MACH.—Lacquering Electric Wire

LACQUERS—For Electric Wire

Chemical Products Co., E. Providence, R. I.

LAME—LAHN—

Kassel Export Company, New York, N. Y.
Montgomery Co., The, Windsor Locks, Conn.

LIME—

Warner Co., The, Philadelphia and Bellefonte, Pa.

LUBRICANTS — For Metal Cutting, Stamping and Drawing

Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corporation, Brooklyn, N. Y.
Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago.

LUBRICANTS—Wire Drawing

(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope

Swift & Co., Chicago, Ill.
Ironsides Co., The, Columbus, Ohio

LUBRICANTS—for Metal Cutting, etc.

Ironsides Co., The, Columbus, Ohio

MACHINERY—Armoring (Cable, Wire, Hose)

American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used); Pawtucket, R. I.

MACHINERY—Barbed Wire

Glader Wm., Machine Works, Chicago, Ill.
Wafios, Maschinenfabrik, Reutlingen, Wurtt., Germany

MACHINERY—Bobbin Winders

Mummert-Dixon Company, Hanover, Pa.
Wire Equipment Mfg. Co., Trenton, N. J.

MACHINERY—Braiding

Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Wardwell Braiding Mach. Co., Central Falls, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bunching

Cook Manufacturing Co., The, Paterson, N. J.
Edmands Company, The, Providence, R. I.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bundling, Scrap

Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric

American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
Haskell-Dawes Machine Co Philadelphia, Pa.
New England Butt Co., Providence, R. I.
New York Engineering Co., Yonkers, N. Y.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Machinery—Winding Wire)

MACHINERY—Centerless Grinding

Schumag Schumacher Metallwerke, Aachen, Germany.

MACHINERY—Chain Making

Nilson, A. H. Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen, Wurtt., Germany

MACHINERY—Closing Rope

Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod

Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading

Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing

American Insulating Mach'y Co., Phila., Pa.
National Mach'y Exch. (Used), New York.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Cutting

Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Wells, Frank L., Co., Kenosha, Wis.

MACHINERY—Diameter Testing Continuous

Standard Electronic Research, New York, New York.

MACHINERY—Descaling Rod, Dry

Fisher Associates, New York, N. Y.
Herborn, Herborn, Germany.

MACHINERY—Die Making

Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. General Electric Co., Detroit, Mich.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Firth Sterling, Inc., Pittsburgh, Pa.
Wayne Wire Die Co., Hillside, N. J.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Edging (See MACHINERY — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio
Michigan Ovens, Inc., Detroit, Michigan
Rockwell Co., W. S., Fairfield, Conn.

MACHINERY—Extruding
Davis-Standard Sales Corp., Mystic, Conn.
Entwistle, James L., Company, Providence, R. I.
Modern Plastic Machinery Co., Lodi, N. J.
Royle, John, & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Fence
Blashill and Company, Arthur, Worcester, Mass.
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.

MACHINERY—Flat Wire
Fenn Manufacturing Co., Newington, Conn.
Mettler Machine Tool, Inc., New Haven, Conn.
Rockwell, W. S., Company, Fairfield, Conn.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Forming Wire
Baird Machine Co., Stratford, Conn.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen, Wurtt., Germany

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating Wire
American Insulating Mach'y Co., Phila., Pa.
Davis-Standard Sales Corp., Mystic, Conn.
Fidelity Machine Co., Inc., Philadelphia, Pa.
Michigan Ovens, Inc., Detroit, Michigan
Modern Plastic Machinery Company, Lodi, N. J.
New England Butt Co., Providence, R. I.
Pourtier Pere et Fils, Romainville (Seine), France
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Mach. Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Inc., Philadelphia, Pa.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia.
Cook Mfg. Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland. O.
Michigan Ovens, Inc., Detroit, Michigan

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Interlocking Fence Co., Morton, Ill.
Mummert-Dixon Co., Hanover, Pa.
Wafios, Maschinenfabrik, Reutlingen, Wurtt., Germany

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Company, Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, James L., Company, Providence, R. I.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Baird Machine Co., The Stratford, Conn.
Glader, Wm., Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N. Y.
Seybold Transworld Exporters, New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen, Wurtt., Germany

MACHINERY—Packaging Wire
Coulter & McKenzie Machine Co., Bridgeport, Conn.

MACHINERY—Pickling
Lewis Welding & Engineering Corp., The, Bedford, Ohio
Youngstown Welding & Eng'g Co., Youngstown, Ohio.

MACHINERY—Pin Making
Baird Machine Co., The, Stratford, Conn.

MACHINERY—Pointing
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used). New York.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury Conn.

MACHINERY—Poultry Wire Fencing
Interlocking Fence Co., Morton, Ill.

MACHINERY—Pumps for Molten Metal
Wire Equipment Mfg. Co., Trenton, N. J.

MACHINERY—Re-Spooling
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Davis Electric Company, Wallingford, Conn.
Emory, Robert J., Co., Newark, N. J.
Federal Manufacturing Co., Wallingford, Conn.
Mummert-Dixon Co., Hanover, Pa.
National Mach'y Exch. (Used), New York.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wire Equipment Mfg. Co., Trenton, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Rod Mill
Fenn Manufacturing Co., Newington, Conn.
Morgan Construction Co., Worcester, Mass.
Schumag Schumacher Metallwerke, Aachen, Germany

MACHINERY—Rolling Mill
Fenn Manufacturing Co., Newington, Conn.
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Insulating
Davis-Standard Sales Corp., Mystic, Conn.
Modern Plastic Machinery Co., Lodi, N. J.
Royle, John & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Serving
Fidelity Machine Co., Phila., Pa.
Pourtier Pere et Fils, Romainville (Seine), France
Wardwell Braiding Machine Co., Central Falls, R. I.

MACHINERY—Spark Testing
Davis Electric Company, Wallingford, Conn.
Entwistle, James L., Company, Providence, R. I.
Federal Manufacturing Co., Wallingford, Conn.
Modern Plastic Machinery Co., Lodi, N. J.
Peschel Electronics, Inc., New Rochelle, N. Y.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spring Making
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wafios, Maschinenfabrik, Reutlingen, Wurtt., Germany
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Seybold Transworld Exporters, New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen, Wurtt., Germany

MACHINERY—Straightening & Cutting
Continental Fdy & Machine Co., Medart Division, Pittsburgh, Pa.
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Fenn Manufacturing Co., Newington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
American Insulating Mach'y Co., Phila., Pa.
Blashill and Company, Arthur, Worcester, Mass.
Davis Electric Company, Wallingford, Conn.
Davis-Standard Sales Corp., Mystic, Conn.
Entwistle, James L., Company, Providence, R. I.
Federal Manufacturing Co., Wallingford, Ohio
Fenn Manufacturing Co., Newington, Conn.
Industrial Ovens, Inc., Cleveland, Ohio
Modern Plastic Machinery Co., Lodi, N. J.
New York Engineering Co., Yonkers, N. Y.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Equipment Mfg. Co., Trenton, N. J.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Pourtier Pere et Fils, Romainville (Seine), France
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Testing Magnet Wire Coatings for Pin Holes
Federal Manufacturing Co., Wallingford, Ohio
Peschel Electronics, Inc., New Rochelle, N. Y.

MACHINERY—Testing, Physical
Scott Testers, Inc., Providence, R. I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Turks Head
Fenn Manufacturing Co., Newington, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Company, Wallingford, Conn.
Edmands Company, The, Providence, R. I.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.

MACHINERY—for Wire Welding
(See WELDERS—Butt and Spot)

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

MACHINERY—Winding Wire
Emory, Robert J., Newark, N. J.
Entwistle, James L., Company, Providence, R. I.
Fenn Manufacturing Co., Newington, Conn.
Mummert-Dixon Co., Hanover, Pa.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Equipment Mfg. Co., Trenton, N. J.

MACHINERY—Wire Drawing
Cook Manufacturing Co., The, Paterson, N. J.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Fenn Manufacturing Co., Newington, Conn.
Herborn, Herborn, Germany
Morgan Construction Co., Worcester, Mass.
Morgardshammers Mek Verstads AB, Morgardshammer, Sweden
National Mach'y Exch. (Used), New York, N. Y.
Schumag Schumacher Metallwerke, Aachen, Germany
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Wire Forming
Baird Machine Co., The, Stratford, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Larmuth (1947) Ltd., Swinton, England
Terkelsen Machine Co., Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

NAIL TOOLING—Tungsten Carbide
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Brothers, Inc., Cortland, N. Y.

NIPPERS—Wire Cutting
Robinson, M. W. Co., Rockfall, Conn.

NOZZLES—For Extruding Machines
Wire Tool Div., Bridgeport Jig Boring Co., Bridgeport, Conn.

OVENS—Cable Lacquering and Enameling
American Insulating Mach'y Co., Phila., Pa.
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Michigan Ovens, Inc., Detroit, Michigan
Rockwell Co., W. S., Fairfield, Conn.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PANS—Spelter, Galvanizing, Lead
National Annealing Box Co., Washington, Pa.

PAPER—Creped Wrapping
Arkell Safety Bag Company, New York, N. Y.
National Waterproof Papers, Inc., Beverly, N. J.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
Arkell Safety Bag Company, New York, N. Y.
National Waterproof Papers, Inc., Beverly, N. J.
Terkelsen Machine Co., Boston, Mass.

PAPER—Insulating
Plymouth Cordage Co., Plymouth, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—
(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS
(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Lewis Welding and Engineering Corp., The, Bedford, Ohio
Youngstown Welding & Eng'g Co., Youngstown, Ohio

PICKLING TANK LININGS—
Chemsteel Construction Co., Inc., Pittsburgh, Pa.
Haveg Corp., Newark, Del.

PIPES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

PLASTICIZERS—
Celanese Corporation of America, New York, N. Y.
Monsanto Chemical Co., St. Louis, Mo.
Naugatuck Chemical Div., U. S. Rubber Co., New York, N. Y.

PLASTICS—for Wire Insulation
Carbro Chemical Co., Pawtucket, R. I.
Celanese Corporation of America, New York, N. Y.
Electronic Rubber Co., Stamford, Conn.
Monsanto Chemical Co., St. Louis, Mo.
Naugatuck Chemical Div., U. S. Rubber Co., New York, N. Y.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

POTS—Wire Tinning
National Annealing Box Co., Washington, Pa.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio

PUMPS—Molten Metal
Fisher Associates, New York, N. Y.

REEL AND TENSION STANDS—
Davis Electric Company, Wallingford, Conn.
Fidelity Machine Company, Inc., Philadelphia
Industrial Ovens, Inc., Cleveland, Ohio.
New York Engineering Co., Yonkers, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Co., Garrett, Ind.
Milton Machine Works, Inc., Milton, Pa.
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
American Pulley Co., Philadelphia, Pa.
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Garrett, Ind.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Metal Bound
Durkee Mfg. Co. Inc., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., Wm., Westport, Mass.
Strand-Buffalo Corporation, North Tonawanda, N. Y.

REELS—Plywood
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., Wm., Westport, Mass.
Nelson Company, The, Baltimore, Md.
Strand-Buffalo Corporation, North Tonawanda, N. Y.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
American Pulley Co., Philadelphia, Pa.
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L. Mfg. Co., Rockford, Ill.
Hubbard Spool Co., Garrett, Ind.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
American Pulley Co., Philadelphia, Pa.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co. Inc., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
Mason Can Company, East Providence, R. I.
McCaskie, Inc., Wm., Westport, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Wooden
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co. Inc., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
Nelson Company, The, Baltimore, Md.
Strand-Buffalo Corporation, North Tonawanda, N. Y.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

RETORTS—Annealing
National Annealing Box Co., Washington, Pa.

ROD BAKERS—
(See OVENS—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Crucible Steel Co. of America, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
Chase Brass & Copper Co., Waterbury, Conn.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Platt Bros. & Co., The, Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Titan Metal Manufacturing Co., Bellefonte, Pa.

RODS—Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Sheffield Steel Corp., Kansas City, Mo.
Youngstown Sheet & Tube Co., Youngstown, O.

ROLLS—Wire Straightening
Lignum-Vitae Products Corp., Jersey City, N. J.

ROPE—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.

RUST PROOF COMPOUNDS—
(See COMPOUNDS—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See COMPOUNDS—Rust Preventing)

SATURANTS—Cable
Carbro Chemical Company, Pawtucket, R. I.

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio
New York Engineering Co., Yonkers, N. Y.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

SHEAVES—Wood
Lignum-Vitae Products Corp., Jersey City, N. J.

SOAPS—Industrial and Wire Drawing
(See COMPOUNDS—Wire Drawing)

SPOOLS—(See Reels & Spools)

SPOOLS—Stamped Metal for Retail Wire Sales
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

TANKS—Compound
National Annealing Box Co., Washington, Pa.
New York Engineering Co., Yonkers, N. Y.
Watson Machine Co., Paterson, N. J.

TANKS—Pickling and Plating
Chemsteel Construction Co., Inc., Pittsburgh, Pa.
National Annealing Box Co., Washington, Pa.

TESTERS — INSULATION
(See MACHINERY—Spark Testers)

TESTING EQUIPMENT
(See MACHINERY Testing, Physical and Diameter Testing)

TINSEL—Electric Conductor
Kassel Export Company, New York, N. Y.
Montgomery Co., The, Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper, Silver and False Gold Coated, etc.
(See TINSEL—Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.
Wire Equipment Mfg. Co., Trenton, N. J.

TOOLS—Wire Cutting
Porter, H. K. Inc., Somerville, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Machy—Power Transmission)

TRAVERSES & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

VALVES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES & LACQUERS—for Electric Wire
Carbro Chemical Co., Pawtucket, R. I.
Chemical Products Co., E. Providence, R. I.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
Micro Products Co., Chicago, Ill.

WIRE—Aluminum
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Malin & Co., The, Cleveland, Ohio
National Standard Company, Niles, Mich.
Scovill Mfg. Co., Waterbury, Conn.

WIRE—Barbed
Interlocking Fence Co., Morton, Ill.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

WIRE—Brass and Bronze
Chase Brass & Copper Co., Waterbury, Conn.
Jury's Wire Products, Inc., Bloomfield, N. J.
Scovill Mfg. Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.
Titan Metal Manufacturing Co., Bellefonte, Pa.

WIRE—Brush
Spencer Wire Corp., Union, N. J.

WIRE—Bunched & Stranded, Copper
Camden Wire Co., Camden, N. Y.
Utica Wire Corp., Derby, Conn.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Camden Wire Co., Camden, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind
Crucible Steel Co. of America, Pittsburgh, Pa.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Scovill Mfg. Co., Waterbury, Conn.
Sheffield Steel Corp., Kansas City, Mo.
Titan Metal Manufacturing Co., Bellefonte, Pa.
Wickwire Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
Camden Wire Co., Inc., Camden, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Jury's Wire Products, Inc., Bloomfield, N. J.
Spencer Wire Corp., Union, N. J.
Utica Wire Corp., Derby, Conn.

WIRE—For Electrical Conductors
Camden Wire Co., Camden, N. Y.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.

WIRE—Flat, Fine
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Galvanized
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
National Standard Company, Niles, Mich.
Roebling's, John A. Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Magnet
Kassel Export Company, New York, N. Y.

WIRE—Manufacturers
Alloy Metal Wire Div., H. K. Porter Company, Inc., Prospect Park, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Keystone Steel & Wire Co., Peoria, Ill.
National Lock Washer Company, The, Newark, N. J.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Scovill Mfg. Co., Waterbury, Conn.
Sheffield Steel Corp., Kansas City, Mo.
Spencer Wire Corp., Union, N. J.
Titan Metal Manufacturing Co., Bellefonte, Pa.
U. S. Steel Corp., N. Y., N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Molybdenum
Kassel Export Company, New York, N. Y.

WIRE—Music
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., The, Cleveland, Ohio
Spencer Wire Corp., Union, N. J.

WIRE—Needle
Carpenter Steel Company, Webb Wire Division, New Brunswick, N. J.

WIRE—Nickel Silver and Phosphor Bronze
Alloy Metal Wire Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Malin & Co., The, Cleveland, Ohio
Titan Metal Manufacturing Co., Bellefonte, Pa.

WIRE—Oil Tempered
Crucible Steel Co. of America, Pittsburgh, Pa.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.

WIRE—Silver Plated Copper
Camden Wire Co., Camden, N. Y.

WIRE—Special Shapes
Alloy Metal Wire Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
National Lock Washer Company, The, Newark, N. J.
Titan Metal Manufacturing Co., Bellefonte, Pa.

WIRE—Spring
Alloy Metal Wire Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
National Standard Company, Niles, Mich.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Carpenter Steel Company, Webb Wire Div., New Brunswick, N. J.
Crucible Steel Co. of America, Pittsburgh, Pa.
Firth Sterling, Inc., Pittsburgh, Pa.
National Lock Washer Company, The, Newark, N. J.
National Standard Company, Niles, Mich.
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Steel—Also Coppered and Galvanized Steel
Alloy Metal Wire Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jury's Wire Products, Inc., Bloomfield, N. J.
Keystone Steel & Wire Co., Peoria, Ill.
National Standard Company, Niles, Mich.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.
Spencer Wire Corp., Union, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O

WIRE—Straightening and Cutting
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Tinned Copper
Camden Wire Co., Camden, N. Y.
Jury's Wire Products, Inc., Bloomfield, N. J.
Spencer Wire Corporation, Union, New Jersey
Utica Wire Corp., Derby, Conn.

WIRE—Tungsten
Kassel Export Company, New York, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WOOD—for Guide, Rolls, Bushings, Wear Parts, etc.
Lignum-Vitae Products Corp., Jersey City, N. J.

WRAPPING PAPER—Creped
(See PAPER—Creped Wrapping)

YARNS & TAPES—Insulating
Celanese Corporation of America, New York, N. Y.
Pittsburgh Plate Glass Company, Pittsburgh, Pa.
Standard Film Products Corp., Pawtucket, R. I.
Synthetic Thread Corporation, Bethlehem, Pa.

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON 3, NEW JERSEY, U. S. A.

ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE
AND MASTICATING MACHINERY MANUFACTURERS

WATSON

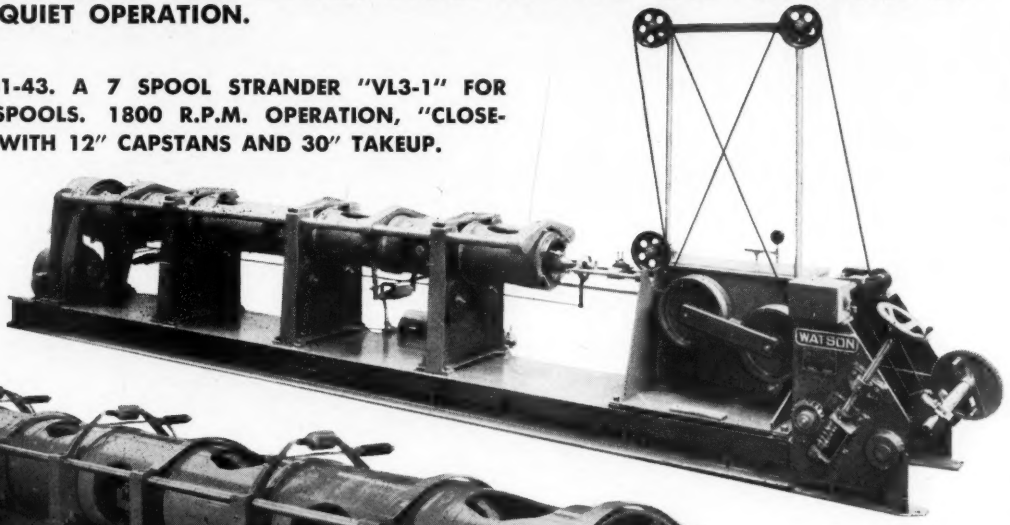
EXTRA HIGH SPEED STRANDERS TYPE "VL"

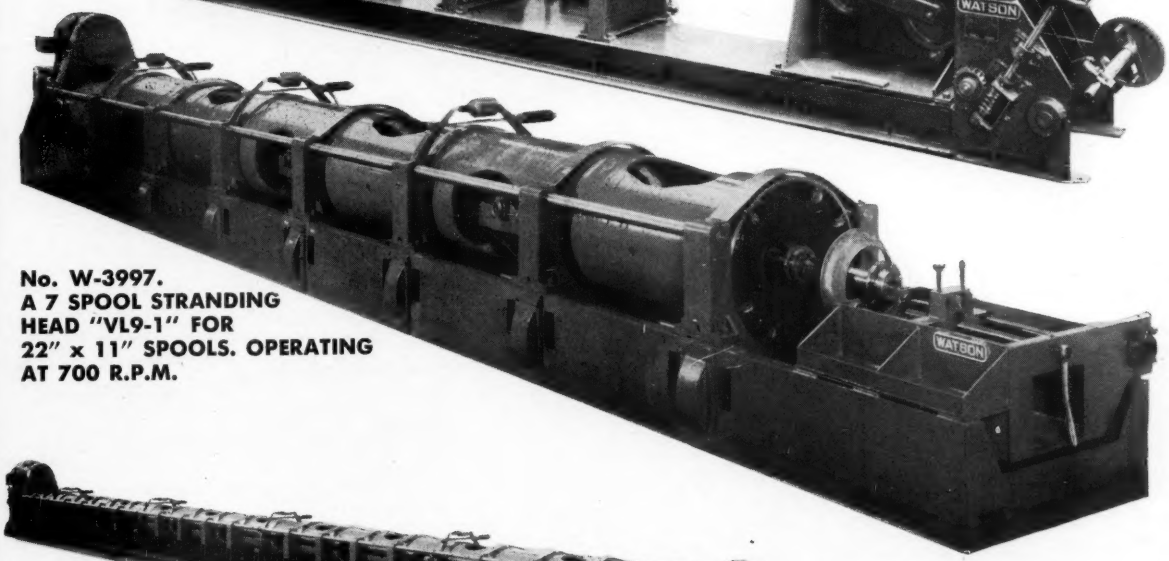
U. S. PATENTS 2,442,817, 2,690,642 & PENDING

NEW UNPARALLELED HIGH PRODUCTION RECORDS ARE REPORTED BY ALL OF THE MANY USERS OF THIS LATEST HIGHEST SPEED DESIGN WHICH IS NOW THE PREFERRED STANDARD IN THE LARGEST AND MOST PROGRESSIVE CABLE PLANTS AND WIRE MILLS. COMPARED WITH OTHER TUBULAR STRANDERS, THE REFINED SIMPLICITY OF THIS DESIGN ACHIEVES GREATEST LOADING EASE WITH RESULTING "DOWN-TIME" REDUCTION.

OTHER OUTSTANDING FEATURES OF THIS DESIGN ARE: PATENTED "SHAFTLESS" SELF-LOCKING BOAT CRADLES—LOWER WIRE AND CORE LEAD ANGLES—EXTREMELY QUIET OPERATION.

No. W-4141-43. A 7 SPOOL STRANDER "VL3-1" FOR 7" x 4" SPOOLS. 1800 R.P.M. OPERATION, "CLOSE-COUPLED" WITH 12" CAPSTANS AND 30" TAKEUP.





No. W-3997. A 7 SPOOL STRANDING HEAD "VL9-1" FOR 22" x 11" SPOOLS. OPERATING AT 700 R.P.M.

No. W-4183. A 25 SPOOL STRANDING HEAD "VL6-4" FOR 12" x 6" SPOOLS. OPERATING AT 900 R.P.M.

OFFERED IN ALL SIZES—LITERATURE AVAILABLE.

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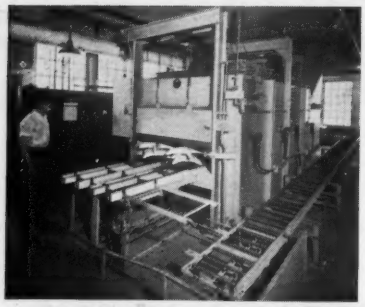
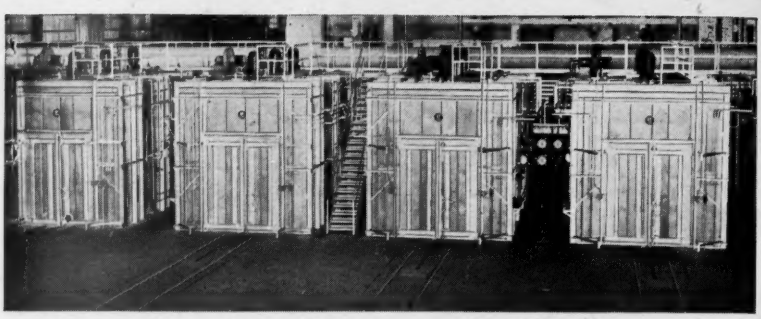


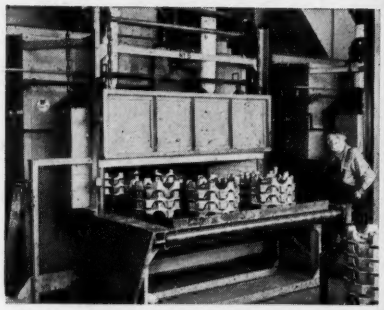
EF aluminum brazing and heat treating furnace in which assemblies are advanced thru three separate chambers, on trays, for brazing, solution treatment and forced cooling.



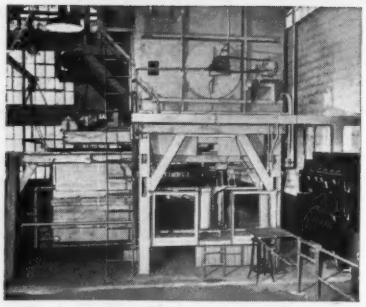
Part of an installation of large EF multiple zone batch truck type direct gas fired units with recirculating fans for uniformly aging aluminum forgings, etc.

EF FURNACES *for* ALUMINUM and MAGNESIUM

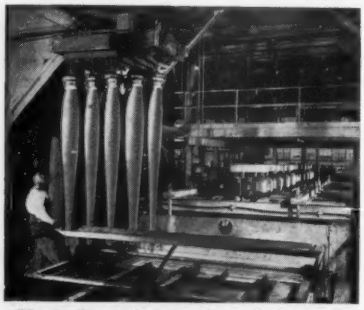
homogenizing, solution treating, aging, billet heating, brazing, process annealing, finish annealing and other processing backed by...



EF combination gas fired, radiant tube and electrically heated roller hearth type furnace used for heat treating aluminum alloy crank case sections, pistons, etc.



EF electrically heated, accurately controlled forced circulation, bottom door opening elevator type installation for aging, annealing and solution heat treating aluminum and aluminum alloys.



EF continuous furnace for solution treatment of forged aluminum propeller blades. The blades are hung from small cars which are lowered into furnace and automatically pushed thru heating chamber, rapidly removed and quenched.

Wide Application

and long experience

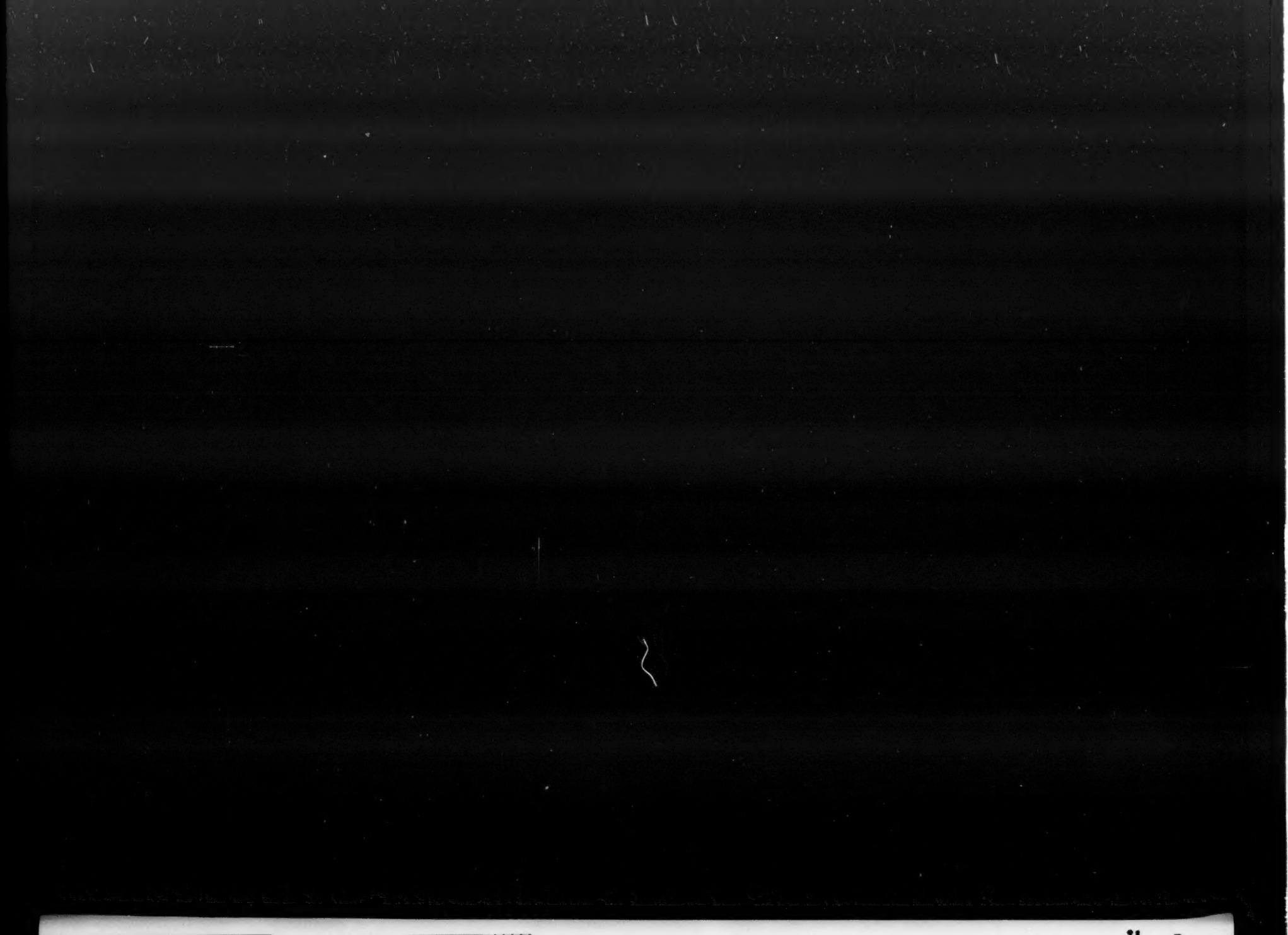
Don't gamble. Play safe. Discuss your aluminum, magnesium or other furnace problems with EF experienced engineers. Our wide experience in this work can save you time, lost production, material spoilage and other expense.

The views on this page show only a few of many installations we have made. Engineered specially for your individual requirement, an EF furnace assures the smooth, uninterrupted flow of material fully up to your capacity and physical specifications. Electrically heated, gas or oil fired radiant tube or direct fired types, whichever method of heating or type of furnace is best for your application and location. Furnished complete with all necessary charging, discharging, quenching, special atmosphere and special handling facilities, thus enabling you to fix complete responsibility for delivery, installation and performance of the entire system as a unit. We are as close to you as your telephone. Call EF engineers. You'll find it pays.

EF

THE ELECTRIC FURNACE CO.

GAS FIRED, OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS, PRODUCT OR PRODUCTION

Salem - Ohio

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